

RECORD

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F. R. Fosberg

Collection and Field Note Book

No. 46

(June 25, 1956 -- Aug. 6, 1956)

(37727 -- 38134)

RYUKYU ISLANDS

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Changes in names of Ryukyu plants

✓ 37224 *Pteris semipinnata* var. *dispar* (Kunze) Bals

✓ 37366 " " "

✓ 37227 *Pteris ryukyuensis* Tagawa.

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A BOORUM & PEASE PRODUCT

1950 Ryukyu Is

ISHIGAKI ISLAND,

1

3

~~June 25~~ - just above
Waterworks

Patch of *Acacia confusa*
plantation with little
undergrowth, dense
canopy.

Clump of a small
bamboo. Formed a
dense clump, with
very short runners
coming out from it.

June 25 - intersection
of coast road with
road to Nagura.

Patch of woods.
On outer edge appears to
be mainly *Ficus*, 2 sp.
with some *Clerodendrum*,
Calophyllum, *Bischoffia*,
and a border of *Leucaena*.

170

Small dark area on
photo is a thicket of
clumps of bamboo
about 3-4 m. tall,
canes arching,
bases of clumps
up to 1 m. diam.
spaced about 2 m. apart.
Canopy complete
ground cover of *Aplidium*.

(70-78 m)
photo 940-32

and a creeping piperaceous¹⁸ vine.

One habit seen here and collected. Curled up at the base of a bamboo clump, color blended very well with that of ground.

171 An area of *Leucaena*, pure stand, essentially, about 6-8 m. tall, stems all sizes up to 5 cm. thick, spaced 1 m. or less apart. No undergrowth or ground cover except *Leucaena* seedlings.

172 Clearing overgrown with *Imperata*, scattered fine saplings, one or two *Acacia* bushes, and many *Leucaena* saplings. *Ipomoea indica* and *I. littoralis*.

173 Secondary thicket of saplings of *Clerodendrum* *Ficus* (cordate lfd. sp.), *Macaranga*, *Trema*, etc. A few large trees of *Trema* and a large lfd. sp. of *Ficus*. *Ophiorrhiza*, etc. on ground.

On escarpment overlooking marsh the thicket is larger, more mixed of *Ficus*, *Hibiscus*, *Melia*, *Pipturus*, *Pandanus*, *Mallotus*, *Macaranga*, *Cerbera*, *Clerodendrum*, etc. Locally patches of *Leucaena*, even more locally, *Avengia*.

June 25

(175)

very weedy, fallow field
has almost a solid
growth of:
 a *Asplenium conjugatum*
 a *Digitaria* sp.
 c *Commelinia diffusa*
 c *Gymnarrhena*
 o *Agave* conyzoides
 c *Cyperus* 2 sp.
 o *Pimbristylis*
 n *Cypera canadensis*.

adjacent abandoned area
has a 1-1.5 m. growth
of *Mallotus*, *Clerodendrum*,
Lambertia, *Solanum*,
nigrum, *Hedysarum palmipes*,
Rubus sp., *Broussonetia* sp.

(176)

Secondary forest
adjacent:
 a *Mallotus*,
 o *Ficus*
 f *Clerodendrum*,
 f *Macaranga*
 c *Trema*
 n *Podocarpus*

farther in

is locally some *Acacia*,
Melia etc. *Melanolepis*,
 Largest trees are *Trema*
 General canopy at
 about 6-8 m.
 most trees about 5 m.
 dbh. some up to 10.
 Some undergrowth of
Maesa, ferns,
Alocasia, *Mallotus*,
 seedling (very spindly)
 occasional very spindly
Micanthus.

Spacing of trees 1-3 m.
 when they are larger
 the spacing is wider,
 smaller, closer.

(177)

(178)

Up the slope are newly
 cleared areas
 in a taller secondary (?)
 forest on post. Miocene
 limestone.

This forest is up to 10 m
 tall, dense has several
 spp. of *Ficus*, *Macaranga*,
Thelia, *Bischoffia*, *Ardisia*,
Melanolepis, *Diospyros*,
 tangled with *Flagellaria*,
 and *Pomoea*, *Smilax*, *Casuarina*
 Undergrowth of *Psychotria*, *Alocasia*,
Ardisia

The weeds in the newest clearings are growing, *Solanum nigrum*, *Molothrus bonae* *indica*, etc.

Lesquerella is plainly in the newest one, not much of a crop.

There are 3 of 3 or 4 post-miocene terraces here, cut by a deep ravine. The surfaces are not especially rough except locally. One deep sink hole or collapsed cavern was noticed.

June 25 just above waterworks, south of Maizhi Take

37727 (bamboo) *Bambusa multiplex* (Fr. & Savat.) Makino one clump on sloping ground at edge of acacia plantation

June 25 ~~slopes~~ east of Kudo Beach, lower north ~~slopes~~ of ~~Maizhi Take~~ Iiso Dalse

179
(Photo
940-7)

June 25 - 1 km. S. of Maizhi Take a patch of "rock pasture" land with rough limestone protruding through the surface of the soil.

The vegetation is thick grass, mostly *Imperata*, and a few scattered bushes.

det F. A.
McClure
60 m.

dense clumps with short runners formed by downward curving branches, ending in erect culms up to 4 m. tall, green.

25-⁶⁰
60 m.

The weeds in the clearing
are largely *Ipomoea*,

25-60

37278 *Momordica*
4 growing in dooryard

5 29 *Mallotus* ^{giganteus} (L.) A. N.
dominant in second growth,
forest on low ground.

5 30 *Thespesia* ^{occidentalis} (L.) C. B.
scattered in second-growth
forest

1 31 *Psychotria* ^{leptophylla} (L.) H. W.
occasional

3 32 (old) *Veronica arvensis* (L.) Gray ^{det. L. A. Gray}
small colony in forest
or on level ground.

1 33 *Youngia japonica* (L.) DC.
rare in new clearing
on rough limestone boulders.

June 25 - just east of
Kido Beady, ~~north~~ n. w. of
Mashii Lake
as in old field with grass
and bushes.

6 34 *Leucaena glauca* (L.) Benth.
common, dominant in
surrounding thickets.

25-60

prostrate, flowers yellow,
fruit extremely warty,
used as food. "tao" "nigauli" (?)
small tree 4 m. tall.

tree 6 m. tall, fruit
dark purple when ripe.
shrub 1 m. tall, ripe
fruit size and
appearance of a small
red cherry
erect, sheaths bronze
purple; flowers light
green with whitish
lips with dark purple
veins. corm depressed
globose, white, firm, fleshy.
flowers yellow.

shrub 2 m. tall (others
to 6 m.) flowers white
turning salmon color.

10 1950 Ryukyu Is.

37735 *Ipomoea indica*
common

5 36 *Ipomoea littoralis*
common

5 37 (cubit.) *Trichosanthes triciliata* Wright
in thickets

ISHIGAKI ISLAND.

11

twining over bushes,
extensive; flowers light
blue.

twining over bushes;
flowers rose pink, ~~or~~
maroon in throat.
extensive vine, climbing
over small trees;
flowers white on
erect inflorescences,
falling when touched,
corolla lobes conspicuously
fimbriate.

June 26 - Kobama & Shima
from boat passing to south
and east

The island is ~~one~~ of
rather low relief, with
one hill rising to a little
less than 100 m. It is generally
grassy on the ~~south~~ ~~west~~ sides.

~~On~~ A patch of wood about
in the center, several small
bits of wood ~~on~~ on the
terrace around the hill,
and scattered trees on
the south ~~east~~ plateau.

From a distance the grass
looks like Imperata, judging
by the color.

Sand bar a couple of
miles east has a
clump of bushes which
has accumulated a
small dune.

Several rocks, of chert ?,
in this area, have no
vegetation visible from
about 1 km. north.

On northeast side of
Kobama the bluffs and
rough places seem to
have some sparse scrub
as well as grass. Littoral
forest a scrub back of beach in
central part.

The small flattish
island north of Kobama,
"Rabbit Island"

is entirely grass covered
except a small clump of
trees or large bushes in
the center at the top of
the low knoll and some
littoral scrub at the
east end. It is surrounded
by low cliffs.

Northwest end of Kobama
is quite brushy

June 24 Iriomote Jima

The ~~south~~ and ~~with~~ east coast are very abrupt and generally wooded.

Along the ^{northern} ~~easterly~~ part of the ~~east~~ coast are many truncated spurs with sloping terraces at their bases. Many of these surfaces and terraces are grassy, giving a pattern of irregularly triangular light green scallops, points up, against the dark green background of the wooded mountains.

Handslide scars are numerous and in various stages in re-vegetation. There is no question but that these provide a chronologically continuous series of habitats on an island like this which, otherwise, before man would have provided no open upland sites.

There seem to be large areas of bamboo on the tops and upper slopes of some of the high mountains, especially those on the ~~so~~ north east corner.

Below along the north coast near the east end is a flattish park-like terrace with grass and scattered trees. Headlands are wooded or scrub covered. The scattered trees on the terrace are mostly pine. The headlands are rounded domes of limestone with smooth cliffs around them.

Several large deep valleys. These seem to have larger trees and more uneven canopy than the ridge and general topography, where the canopy seems smoother and finer textured.

Toward the center are some black sandstone(?) cliffs at high altitude, with apparently caves in them.

Scattered all along the north coast are patches of the park-terrace with pines mentioned above. These have wooded ravines.

A large bay has a fine vertical waterfall at the head of one of its valleys. On the ~~both~~ sides of this bay are many undercut limestone remnants. Some of these are on a small island in the mouth of the bay. They are very rough and covered by pandanus scrub in large part.

The village of Funaura is on the west side.

Trees in village are Hernandia, Hibiscus tiliaceus, Heritiera littoralis.

The country back of Funaura toward Manchi is covered by Imperata with scattered pines, locally clumps of Cycas and Pandanus. Cows shot wooded with a few

patches of sugarcane. On higher ground, few patches of sweet potatoes and dry rice. Hills round about wooded.

Beach-ridge along coast covered by a littoral forest of Hibiscus Pandanus, Quettarda Pipturus, Pouteria, Hernandia, Lcaevola Allophyllus, even Garcinia, Bischoffia. Back of it is a depression with Imperata, Artemisia and weeds.

Back of this low hill, with a mixture of Imperata and Pandanus thickets, scattered clumps of Cycas and occasional pine seedlings. Some patches of Gleichenia. Scrubby forest back of this.

At Nozaki Bridge is a low flat between 2 streams. Part of it is in rice, part in thickets of Excoecaria, Pandanus, Lcaevola Pennina, Hibiscus. Cycas on higher spots, a little mangrove on margins of estuary on west side.

June 26 - Natori & Shima
from boat passing
a couple of miles to
south

The island looks
generally flat and of
rather low elevation,
with a plateau-like
hill in the center. Villages
are conspicuous. The
island presents a wooded
appearance to the sea,
possibly mainly of
~~Acacia~~ *confusa* and
Ficus. Probably the
Acacia at least is
mainly in hedges and
thickets planted around
fields, but this cannot
be seen from the sea.

After passing a small
village the road goes
over some low hills
of porous limestone
covered by thickets
in which *Ficus*, *Aveng.*,
Pipturus, *Hibiscus*,
Erythrina, *Musa*,
Macaranga, *Melanolepis*
are prominent, also *Melis*,
Broussonetia, *Pandanus*,
Mallotus, *Pouteria*, *Allophasma*
(p. 70)

June 26 Iriomote (ctd.)

This littoral forest extends in both directions from the bridge in a dune ridge. Westward this expands into a flat. Here is a clumpy version of the forest, clumps 3-4 m. high, spaces between them filled by *Imperata* and weeds.

Tetrapanax papyrifera local here. All stony plants up to 1 m. tall.

(From 7.19 by car)

Between limestone outcrops are cultivated patches of sugar cane and sweet potato.

Going down from this another village is approached. Here an edge of a paddy field is eroded away, exposing a bed of shells - *Trochus*, *Jubaea*, etc. about 3 m. down. Shells look well preserved. (Nebarni)

This village is on a low flat, largely in rice.

On the other side of this village are low sandstone hills covered by *Miscanthus* and scattered miscellaneous bushes, a few pines. Here is the coal mine.

This gives way to a few porous limestone hills with thickets. Then a line of sandstone cliff backs of a broad sandy flat. The cliffs have mixed broadleaf and pine forest on them, quite thick, with a few *Livistona* and *Myrsinaceae*.

The sand flat has thickets of young *Casuarina*.

At Urauchi are spectacular cross-bedded sandstone cliffs and a pyramid in the mouth of the bay. Pines, Pandanus etc. on the cliffs but they are mostly bare.

On the other end of the sand flat are high, undercut cliffs of limestone capped by thickets.

south of Urauchi the coastal hills are covered by an open growth of pines with low tangled vine-covered scrub and some grass between. Obviously at one time a pine savanna which, not being burned, is now growing up, second-growth between the pines.

June 24 - Sonai Point west of landing there is pitted limestone, both as cliffs and huge boulders on the beach. On the cliffs the vegetation is largely Pandanus, Liguistrum, Cycas, Diospyros, Hibiscus, etc. On the rocks just at or above sea level is a special flora of Limonium, Illecebren?, Hedyotis, Sedum, Zygia, etc.

The rock changes, westward, abruptly to sandstone. The special flora disappears and is here not replaced.

The vegetation on the sandstone cliffs is not as luxuriant as on limestone, and is dominantly Pandanus and Scaevola. A number

of ferns; esp. *Pteris*, *Sphenomeris*, *Adiantum*, and a large *Sedum* are found in the crevices, with a little *Hedyotis albopunctata*, and *Fimbristylis cymosa*.

Cycas and *Diospyros* perched are occasional in the cliff, scrub.

(Copied from other notebook).

The flora of the saline limestone surface *Illecebren?*, *limonium*, *Carmona*, *Hedyotis*, *Zygia*, *Sedum*, disappears abruptly when rocks turn to sandstone, partially reappears on a bit of limestone at the end of the point; then on soft sandstone, only *Hedyotis* and *Angelica* persist, the *Hedyotis* in small amounts. On the sandstone are several ferns, *Fimbristylis*, etc. that are not on limestone. *Ischaemum* or both. Large plants: *Pandanus*, *Cycas*, *Scaevola*, *Diospyros* or both.

24

1956 Ryukyu Is.

Funaura
June 24 - n. of Funaurabeach forest on sand
ridge and flat37738 *Pysimachis mauritiana* Lam.

2 in full sun on sand

2 39 *borghiuus halophyllum*

along road, in sun.

2 40 *Tetrapanax papyrifera* (Miq.) R.K. Ko

in open area

2 41 *Carmona retusa*

occasional

3 42 *Seaverola sericea* Vahl

very common

2 43 *Ligustrum japonicum* Thunb.

common

2 44 *Psychotria* sp. (bark to 1 m.)

occasional

2 m.

Iriomote I.

25

flowers white.

shrub about 2 m. tall,
sterile.ascending shrub,
flowers white, ripe fruit
orange-red.shrub 1.5 m. tall, flowers white,
fruit white (calyx lobes
not especially variable,
flowers vary from white
to somewhat purplish).shrub 3 m. tall, fruit
immature.shrub 2 m. tall;
immature fruit eaten,
pleasantly acid.

June 26 Iriomote

a *Halodule uncinervis* (Forsk.) Aschers. (narrow-
leaved form) b *Aschers. + sr.* (a few leaves)
c *Halophila ovalis* (L.) R. Br. (2 very small plants)leaved form) det. C. den Hartog 1969 (all these plants are
under No. 37745a)
0 m. sterile, rhizome buried.2 45 a abundant in shallow water
on sand bottom4 46 *Begonia* sp. (var. not determined)
on shaded very rough
limestone2 47 *sedum* sp. (var. not determined)
in crevice on sandstone cliff.20 m. 46 leaves fleshy, flowers
white.

5 m. 47 dries fruiting plant only.

26

1950 Ryukyu Is.

37748 *Podocarpus henryi* (Bl.) Miq.
common on sun-weathered sandstone

3 49 *Sphenomeris chinensis* (L.) T. Nees
crevices in sandstone cliffs

3 50 *Pteris fawcettii* Hieron. (adsp.)
crevices sheltered crevices in sandstone cliffs.

5 51 *Pandanus* abundant, generally, on sandstone cliffs.

2 52 *Timbostylis* rare in crevice on top sandstone cliff.

2 53 *Hedysotis* occasional in crevice on sandstone cliff

3 54 *Pittosporum tobira* (Willd.) Ait.
common on limestone cliff

5 55 *Diospyros ferrea* (L.) Willd.
common on limestone cliff.

2 56 *Argyroxiphium* common on rough limestone just above sea level.

2 57 *Hedysotis* abundant common on rough limestone just above high tide level

3 58 *Illicium* abundant on rough pitted limestone just at or above high tide level.

2 59 *Limonium articulatum* (Lam.) H. B. K.
common on rough limestone just above high tide level

2-5 m.



Iriomote I.

27

branched herb.

shrubby tree 3 m. tall.
fruit head subglobose,
basal fleshy part of
phalanges swollen,
ripe fruit orange red.
caespitose

prostrate, fleshy, flowers
white.

5 m. shrub, fruit immature
shrub; fruit yellow.

5 m.

3 m.

2 m.

just above sea level.

1 m. 3 prostrate, fleshy, matted;
flowers pink.

1 m.

3 dwarf shrub, compact;
flowers lavender.

28

Ryukyu Is.

37760 *feddei* Willd. H. A.
 1 rare on rocks ~~just~~ above
 high tide level.

June 26 - Shirahama
 common on weathered
 sandstone banks.

2 61 ~~Anadopogon~~ *Polygonum rotundifolium* L.
 2 62 *Lycopodium cernuum* L.

July
 June 27 - ~~the~~ Banare + Shima
 on beach ridge along
 inner beach

63 ~~the~~ *Callicarpa*
 inner edge of beach scrub
 64 opening in beach scrub

Beach scrub here mixed,
 1.5 - 3 m. tall, dense.

- f *Isaevola sericea*
- f *Messerschmidia argentea*
- f *Hibiscus tiliaceus*
- c *Clerodendrum inerme*
- c *Pittosporum tobira*
- f *Misanthus floridulus*
- f *Diospyros ferrea*
- o *Callicarpa*
- c *Premna obtusifolia*
- f *Pandanus*
- o *Couteria*
- o *Guettarda speciosa*

2 m.

20 m.

2 m.

2 m.

Imonote I.

29

tufted.
 2 creeping, with erect
 fruiting stems.

13 shrub, m. tall.
 - flowers lavender.
 leaves subcoriaceous;
 flowers lavender.

June 27 - Shirahama
Around Shirahama
the lower hills are
partially cleared and
in temperate with scattered
pines.

The forest here is
quite moist. Ferns
are ~~so~~ abundant.
Ferns are found down
to a low altitude.

June 27 - Nakara & Gawa
trip up by small boat
This is a drowned valley.
The entrance is between
bluffs of sandstone
10-15 m. high, on the
north side woodad down
to the water, on south side
the lower cliffs are bare.
Pines are left behind
at the entrance and the
only dominantly non-woody
vegetation from there on
~~so~~ occurs on landslide areas
and several small rice
patches in mouths of
small ravines just above
valley mouth.

0.5 km or so up the river
extensive low mangroves
start on the south side.

Up a little it shifts
to north side. seems to be
on concave sides of
curve, and in indentations.

The forest on the bluffs
seems rather scrubby.
Ferns are conspicuous.

The forest of the
main slopes seems to
be largely of *Quercus*
cuspidata, so far as can
be made out from the
boat.

The mangrove up a mile or so is largely *Bruguiera* with *Rhizophora* and *Lumnitzera racemosa*. A small clearing here on left (north) bank.

Above this the river narrows, the mangrove ~~get~~ diminish to narrow bands along the banks. *Rhizophora* drops out, ferns become more noticeable on the cliffs.

Above this the river forks and at the fork is an extensive mangrove swamp. The mangrove in this whole area does not seem to be more than 2-3 m. tall; ^{above high tide} is taller up-river than at the mouth.

Another mile or more up the mangrove becomes more and more replaced by *Pandanus* thicket of about the same stature. Both mangrove and *Pandanus* here become 4-5 m. tall.

The river meanders through broad flats in the left fork of the valley. These flats are 1-2 m. above high tide. On higher spots the *Pandanus*

is mixed somewhat with *Prosopis* *ferruginea* some *Barringtonia racemosa*, *Rhus*, *Mallotus*, *Biroffia*, *Macaranga*, *Amomum donax*, *Hibiscus tiliaceus*.

A few rice patches scattered along this flat. *Bruguiera* and *Lumnitzera* still common well up the river, but other more mesophytic trees become more and more common. Also a small bamboo. More rice patches till most of flat is covered by them.

The steep slopes and mountainsides above continue to be densely forested, probably largely with oak. Where the meanders approach the cliffs the oak comes down to the water. The forest is festooned with great tangles of *Freyssinetia*. Ferns are very luxuriant.

Mangrove finally drop out, well above the limit of brackish water.

Barringtonia becomes common, *Fraxinus*, *Xylocarpus*, bambos, *Eugenia jambos*, *Ficus*.

The flat becomes quite narrow and the vegetation more luxuriant.

Finally, at head of navigation flat disappears

Helen Foster went to top of the high hill behind Shinahama. Forest here mainly *Quercus cypidata*, as far as large trees are concerned, but nothing larger than 20 cm. dbh and 10 m. tall.

Second story of smaller trees dense enough to shade out most undergrowth. Soil a thin yellow sand with almost no humus.

Miscanthus seems to come in first when land is opened up. *Gleichenia* comes in on landslide scar or where soil is eroded away. Apparently repeated disturbance and burning favors *Imperata*. Pine is found only in coastal areas and probably is a good indicator of past disturbance.

Topsoil
of *Imperata*
most
over
grows
10 cm dbh
at most.
in this
disturb.

even where growing in mixed forest now.

Yaka-banana-shima is pretty well denuded on seaward side. Some *Cycedrus* *Pandanus* thickets on upper slopes, *Imperata* between. A line of vertical cliffs, nearly bare. Talus below thickly grown with a mixture of *Miscanthus*, *Pandanus*.

Outer part of south side about bare except for a patch of scrubby wood on talus. Inner part with many pines.

and on cliff above on one corner. I - this on a completely inaccessible cliff top is a clump of *Livistona*.

Cycas absent on western-most slopes and cliffs, which have mainly *Miscanthus*.

1954 Ryukyu Is.

June 27 ~~Fukka~~ Funanki
 Hills here are wooded
 to base, lower slopes
 rather disturbed, with
 some pine, some *Miscanthus*,
Livistona on bluffs, tops
 of lowest hills covered
 by pine groves.

Trees in town are
Garcinia, *Calophyllum*,
Ficus, *Morus*, *Casuarina*,
Citrus.

Funanki bay has
 slopes coming almost
 to water, wooded all the
 way, scarcely any bare
 cliffs, except on Uchi-baras
 shima.

Uchi-baras shima
 shows various stages
 in degradation of vegetation
 from thickets with pines
 through *Miscanthus*
 with pine, *Imperata*
 with pine, *Imperata*
 without pine, progressively
 toward outer headland.

Beyond Funanki the
 headlands and spurs tend to
 be grassy. scattered pines
 on these and also in thicket
 behind them.

June 27 Amatori

Surrounding hills
 are grassy, with
 scattered pines high
 on slopes, clumps of
 cypress on lower slopes.
 No real forest within
 almost 1 km of village.
 Village lives by cutting
 wood. Many trees
 around village - *Hernandia*,
Hibiscus tiliaceus, *Pouteria*,
Pandanus, *Messerschmidia*,
Terminalia catappa, *Casuarina*,
Ficus, *Morus*, *Garcinia*.

Beach ridge with
 beach scrub extending
 eastward from village.

Immediately back of
 village some steeper
 bluffs have thickets
 of *Pandanus* and various
 bushy trees, *Garcinia*,
 pine, *Livistona*, much
Miscanthus.

Between these bluffs
 and village a belt of
 paddy fields, on patches
 of *Melumbo*. Some small
 reed brakes - *Phragmites karka*.

Village streets lined with rows of tall *garunna*. Several tall *Livistona*.

Broad beach has well developed belt of *Ipomoea pes-caprae*, *Jitis*, *Spinipes*, *Wedelia bipinnata* in front of beach scrub.

Some of the hills overlooking the shore on both sides of village have thickets of bamboo mixed with cycads and *Miscanthus*.

June 27 - The general pattern of the vegetation of this west coast of Okinawa seems to be dense rather low forest on the high mountain slopes, this predominantly of *Quercus cuspidata*. There is not especially dense undergrowth or luxuriance of ferns on the high slopes up to 200 m. at least. The trees are, in general, not large.

Nothing known of slopes higher than 200 m. except that from the sea they look the same. Landslide scars are common on the steep slopes covered by *Gleichenia* or *Dipteris*.

The deep valleys have similar oak forest on their walls, but wetter and with masses of ferns and *Freyzinettia*. Steep slopes are often completely covered by large ferns.

The lower, tidal parts of the valleys, drowned to a considerable depth, have *Pandanus*, *Beringtonia racemosa*, and other swamp species along the rivers, then flats appear covered by *Pandanus* thickets and mangrove, with paddig fields in suitable places. These flats give way to extensive mangrove swamps on the concave sides of meanders, with *Bruynia*, *Lumnitzera* then increasing proportion.

of *Rhizophora*. Excess a common generally along these river margins.

On the ridges, toward the sea the forest degenerates to thicket with scattered pine trees. This gives way to ~~to~~ *Miscanthus* with pine, *Pandanus* thickets on steep places and in ravines, mixed with other things.

The headlands may have *Imperata* either with or without scattered pines. Some may have *Miscanthus*.

Flat bottoms of small valleys may have nice fields ~~or~~ or *Imperata* and thickets.

Beach ridges are characteristic across small valley mouths and have dense beach forest or scrub with *Hernandia secunda*, *Boutaria*, *Hibiscus*, *Messerschmidia*, *Guettarda*, *Diospyros*, *Pandanus*, *Allophylus*, *Premna* etc. At the top of the beach may be *Sporodes per-caprae*, *Vitis*, *Spiraea*, *Thunbergia*, *Ipomoea*,

etc. Making a belt that attenuates out down the beach.

Where there are limestone rocks along the shore or low rough limestone cliffs the scrub or scrub forest is thicker and richer in species than on sandstone. It is dense and tangled, the abundance of *Pandanus* making it difficult and painful to traverse, this in addition to the dissected limestone a "bad" surface.

Along the rocks at about high tide mark or just above on limestone rocks is a characteristic community of compact halophytic plants, mainly *Limonium*, *Pedicularis*, *Urticaria* (?), *Ischaemum*, *Angelica*, *Carmona*, *sedum*, etc.

This is absent on similarly placed sandstone rocks.

The bottoms of the bays where 2 m. or less deep are covered more or less by *anemone* and where exposed almost at low tide, by other marine seed plants.

42

1956 Rapa Nui Is.

Hoka

June 27 - Hoka Banane & Shima

in beach scrub on sand
ridge back of beach

2 m.

37765 Vitex ~~calycina~~ ^{calycina} common in edges of
2 66 Scaevola sericea Vahl
3 very common
2 67 Allophylus timorensis (DC.) Bl
occasional

June 27 - Amatori
at top of beach

1-2 m.

3 68 Ipomoea ~~sp.~~ occasional
2 69 Clerodendrum inerme (L.) Gaertn.
common at edge of scrub
2 70 Thunbergia involucrata (Fast.) R. & S.
~~sp. a~~ on sand
2 71 Wedelia biflora (L.) DC.
very common
3 72 Amaranthus ~~sp.~~ common at top of sea wall
where rubbish is thrown
2 73 Amaranthus common at top of sea wall
where rubbish is thrown
2 74 Sambucus common in shade of beach
forest.
2 75 Euphorbia ~~strob.~~ chamaesyces Burm.
E. alata Benth.

Iriomote).

43

almost prostrate;
flowers violet.
shrub, m. tall;
flowers white.
shrub 1 m. tall,
flowers white.

1-2 m.

12 prostrate on sand; flowers
rose purple, manose center.
low shrub, flowers white.

prostrate, flowering
branches erect.
prostrate, flowers
yellow.
much branched herb.

branched herb.

herb or weak shrub
1 m. tall, flowers white,
large glands yellow.

44

1956 Ryukyu Is.

June 27 - Funanuki

2 m.

in waste places and
edges of rice patches,37775 *Eragrostis amabilis* N. & G.
common1 76 *Cyperus compressus* L.
occasional2 77 *Cyperus* ~~ludoviciana~~
occasional3 78 *Cyperus javanicus* Houtt. ^{3-4 m.}
common3 79 *Ranunculus* ~~indicus~~
common in damp places1 80 *Morus* ~~an~~
planted along village
street back of sea wallJune 27 - ~~the~~ near head of
tidal influence on Nakara-Java
just above5 81 *Rhododendron*
occasional2 82 (*Melast.*) *Tarlmia* ~~gigantea~~ ⁱⁿ ~~indica~~
occasional3 83 *Mallotus* ~~giganteus~~ ^{10-15 ft.}
commonMay 27 *Shirahama*
around dwellings4 84 *Euphorbia thymifolia* L.2 85 *Euphorbia prostrata* N.W.

Iriomote I.

45

caespitose leaves gray-green
prostrate flowers yellow
tree 5 m. tall.shrub 1.5 m. tall, flowers
a beautiful flame-crimson.
low shrub, flowers pink.small tree or shrub 3 m.
tall & staminate & fruiting plant
with capsular seeds with
soft processes - not collected

2 m.

prostrate
prostrate, purple

46

1956 Ryukyu Is.

Hobea

June 21 ~~Yakas~~ Banana Shing 1-2 m.
on beach ridge on inner
side of island

37786 *Ipomoea pes-caprae* (L.) Sweet
uncommon here

1 87 *Melanolepis multiglandulosa*
common in scrub

1 88 *Youngia japonica* (L.) DC.
rare in shaded paths

1 89 *Digitaria* sp. (L.) Beauvois
common inside

1 90 *Phyllanthus*
rare in scrub

2 91 *Spinifex littoreus* (Burm.) Willd.
common at top of beach

2 92 *Messerschmidia argentea* (L.f.)
common in scrub

2 93 *Sesuvium portulacastrum*
common at top of beach

3 94 *Chenopodium* sp.
common on beach

2 95 *Hibiscus tiliaceus*
common in scrub

3 96 *Pouteria*
common in scrub

1 97 *Sondias*
rare along path

2 98 *Artemisia* sp.
common in shade

2 99 *Crinum asiaticum*
common at top of beach

Iriomote I.

47

prostrate creeper,
flower bright rose purple,
shrub 2 m. tall.

flowers yellow.

shrub 1 m. tall; flowers
yellow.

forming large
loose mats, blue-green.

shrub 2 m. tall,
leaves fleshy, silvery
green, fruits fleshy.
loose mat half
buried by sand, flowers pink.

shrub 3 m. tall; flowers
yellow with maroon
centers and stigmas.
small tree, 4 m. tall.

flowers yellow

much branched weak
sprawling herb; flowers yellowish.

scapes axillary in
rosettes, 1 m. or less tall; flowers
fragrant, perianth white, filament and
style maroon purple.

June 29 - north of Ozata
just n.e. of Kara Lake
scrubby forest on
green limestone, much
dissected large boulders.

Forest is dominantly
Ficus spp., *Diospyros*
grantiina, *Ardisia*,
Pandanus, many,
some *Croton* and *Rhizophora*,
in undergrowth
some *Diospyros sericea*,
Ferns present but not
common, small
green bamboo common,
Poddalia and another
spiny vine, also
Cassalpinia.

(179) Pasture nearby on
schist ~~is~~ and a low
ridge of tuff beds
dipping under Eocene
limestone has *Imperata*
with some *Andropogon*,
Evolvulus, *Wahlenbergia*,
Blumea spp., *Vernonia*
cineraria, *Ostbeckia*,
Lygodium, *Lettuce*,
Psidium, etc.

180
(photo
950-107)

June 29 - Togata
left hand Eocene limestone
knob - wooded with
a scrubby forest, sparse
at top, dense at base
dominantly *Ficus* spp.,
Machilus, *Diospyros*
grantiina, *Laphidopis*,
Rhus, *Ardisia*, *Garcinia*,
Melanolepis, etc.
a solid mass of energy
in undergrowth -
up to 4 m. high, also
much *Alocasia*.
Forest to 6-8 m., canopy
uneven

A few ferns, *Lipix*
covering rocks very
sparsely. Some *Ipomoea*
and *Hoya*.

Limestone is dissected
and jointed into
huge blocks, not too
rough a surface.

182

Weedy field at base will:
Bidens pilosa
Solanum nigrum
Lyndellia nodiflora
Paspalum conjugatum
Digitaria sp.
Imperata cylindrica
fida
Ageratum conyzoides

1956 Ryukyu Is.

Gynura
Coryza canadensis
Xanthium
Portulaca oleracea

183
 Photo
 970-1087

Takam

11,000 ft. ISLAND.

Knob of Eocene limestone
 back of large one on
 right.

Densely covered by
 forest of *Ficus retusa*,
Diospyros maritima,
Pouteria, *Mallotus moluccana*,
 Undergrowth of *Arenga*
Tamala, with *Pisonia aculeata*,
Epipremnum, *Flagellaria*,
Drypetes neraria,
Piper, and other vines
 abundantly tangled
 in it. *Nephrolepis* and
Asplenium nidus common
 at base *Pisonia umbellata*

184

In the saddle between
 this and the larger peak
 the forest is mostly
Pisonia umbellata
 with *Pipturus*, *Boehmeria*,
 etc. *Arenga* vines,
Asplenium in ground.

185

The forest on the larger
 knob is more luxuriant,
 richer in species.

Has *Pouteria*, *Garcinia*,
 one more sp. of *Ficus*,
Hibiscus tiliaceus,
 in addition *Tacca* is
 common. Vines abundant.

~~Gymnos~~
~~Corysta~~
~~Xanthium~~
~~Lysimachia~~
~~Portulaca~~ ~~feracea~~

Ficus retusa dominant
 on top ridge.

The limestone is
 dissected into pinnacles.
Nephrolepis and *Asplenium*
nidus abundant on top.

June 29 - ^{back of} ~~Togato~~ Hoshino, Tozai Dist.
 on hills of sharply
 dissected hard Eocene limestone,
 densely wooded.

37800 *Pyrrosia leucophylloides* ^{syn. spathulata}
 2 ~~clinging~~ on shaded vertical
 rock surfaces

1 01 (freq) ~~rhizome~~ ^{rhizome} ~~rhizome~~ ^{Tagawa}
 on flat earth surface between

5 02 *Asplenium nidus*, L.
 on bare shaded rock

3 03 *Quercus miyagii* Koidz.?
 rare, near top of highest hill

5 04 *Bidelia*?
 rare, near top of highest hill

5 05 *Heterosmilax japonica* Koidz.
^{syn. H. japonica} ^{det. T. Koyama 1957}
 occasional

1 06 *Piper heptaphyllum* ^{syn. Piper}
 very common on ~~ground~~ ^{ground} ~~ground~~
 and climbing on tree trunks
 and rocks.

100m. clinging close to rock;
 leaves fleshy.

50m. rhizome scarcely buried;
 sterile.

150m. large rosette, collecting
 a mass of dead leaves
 in center.

150m. sterile tree 8 m. tall,
 leaves glaucous beneath.

150m. tree 8 m. tall; fruit immature.

100m. vine climbing in trees;
 fruit immature.

50m. creeping and climbing
 vine, dark green; buds
 very young.

54

1956 Ryukyu Is.

37807 *Pisonia umbellifera* (Forst.) Fenzl.
common in valley in saddle and around base of hills

2 08 *Asplenium*
local on earth in saddle

6 09 *Stictocardia tiliaceifolia* (Desf.)
tangled in thicket

5 10 *Peperomia*
common on rocks

5 11 *Microlepia* (L.) Gray (Thunb.) Presl
rare
same - clearings and thickets

1 12 (~~acanth.~~) *Ajuga elatior* Ohwi
rare in new clearing from which dry rice had been harvested.

1 13 *Glossyina*? *Ichnanthus* (L.) Presl (F.M.)
in shade at edge of clearing

5 14 *Alpinia speciosa* (Wendl.) R. Schum.
edge of thicket
(*Glossyina elliptica* (Thunb.) Presl)

2 15 *Asplenium*
common in damp thicket

50m

100m

50m

75m

50m

50m

50m

50m

STAND.

55

tree 3 m. tall, 15 cm. dbh.
with soft pulpy brittle wood; flowers dull white, stigma like a smashed brush, slightly oblique.

rhizome scarcely buried, spreads out, fertile over arching.
extensive vine
fleshy procumbent.

flowers white.

prostrate
canes 1 m. tall. flowers waxy, white, staminode orange with red veins.
fruit ribbed.

June 29 - just ~~out~~ ^{1 km. E. of} of
 Kara-dake, ^(1 km. E. of) salt of Ayato
 rolling grassland
 37316 ~~Andropogon~~ ^(var.) A. L.
 common on knolls
 17 ~~Pleioblastus~~
 common between
 limestone.
 3 17 ~~Fuirena~~ ^{variable with}
 in wet spot
 3 18 ~~Hydrocotyle~~ ^{abundance} L. M.
 in damp spot
 3 19 ~~Blumea~~ ^{Loekia} Burm. DC. ¹¹¹ ^{Loekia} 1958
 occasional on
 5 20 ~~Blumea~~ ^{Loekia} Burm. DC. ¹¹¹ ^{Loekia} 1958
 common on
 same - on deeply
 dissected hard Eocene
 limestone outcrops
 17 21 ~~Pleioblastus~~
 common between great
 boulders
 5 22 ~~Cudrania~~ ^{Cochinchinensis}
 var. ^{gerontogea} (L. & J.) Merr.
 rare in forest

40-50m.



caespitosa
 (reeds sent to)

prostrate to ascending.

60m.



culms in small
 clumps from running
 rhizome; to 2 m. tall,
 green.
 slender shrub 2.5 m.
 tall, lower sterile
 branches spiny, fruits
 starting to turn yellow.

June 9th 1.4 km. N. of Ogata

(186)
(Photo
950-6)

somewhat dissected alluvial terrace with medium Imperata grassland with an abundance of several species of *Eleocharis*, some *Blumea* (?), a little *Pteridium*, *Elephantopus mollis*, *Setaria*, *Arthraxon*, *Artemisia*, *Desmodium* (?), *Emilia*, *Fimbristylis*, *Horsetailum*, *Sporobolus*, very small *Ischaemum*, *Melastoma*, etc. *Rhynchospora mura* probably has been burned within a couple of years.

Across road has been burned more recently, is very sparse, with bare ground showing.

The surface of the bog is a thick mat of grass roots, ^{and rhizomes} apparently over a very soft material. Walking on it, its resistance varies from firm to soft in places yielding to knee-deep, or in the Pandanus, deeper.

One sump hole has somewhat open water and *Eleocharis*.

Grassy peat-bog occupies the head of a small dendritic ravine, the lower part of which is in rice.

This has a sparse stand of *Phragmites*, rather locally distributed. Between ^{and in} these patches is a dense grass, with *Panicum repens*, ~~for~~ ^{and} *Elisia*, *Cyperus* (?), *Fimbristylis*, *Centella*, *Eliscaulus*, ~~for~~ ^{and} *Thelypteris*, *gigilodus*, ^{for} ^{and} *Ischaemum*, *Ischaemum*, *Polygonum* (large), *Cornelling*, *Phaseolus*, patches of *Lycopodium*, the whole about 1 m. high, very dense.

Locally areas of impenetrable *Pandanus* thicket with scattered *Glochidion* on very soupy marsh. On the grass are horizontal *Pandanus* stems, surrounded on one side by grassy ridge, other side by secondary thicket with *Glochidion*, *Symplocos* (?), *Raphiolepis*, *Mallotus*, etc.

(188)

(189)

(190)

June 30 - 1.6 km. west of Ozato, e. branch of upper Miyara Gawa in grassy peat bog in broad ravine

37872 *Eleocharis* 350 m.
7 a local colony in hole with open water

5 23 *Lygodium scandens* Local patches

5 24 *Leersia hexandra* Sweet codominant grass

1 25 *Commelinia* rare

5 26 *Isagane* abundant, forming lower story

1 27 *Polygonum* rare

2 28 *Cyperus glaucus* R. & B. rare

2 29 *Fimbristylis* rare

5 30 *Eriocaulon* locally common

7 31 *Cyperus phayreya* R. & B. common

6 32 *Quinnea umbellata* R. & B. common

6 33 *Cyperus* common in edge of

34 *Phylidium lamprostomum* occasional

5 35 *Thelypteris gaggilodus*

culms glossy, subterete, slightly tangled.

~~esters~~ fronds extensively twining and tangled, mostly sterile.

culms weakly erect; leaves unpleasantly scabious. all 3 petals large, bright blue.

Lygodium scandens (Burm.) Link

62

1956 Ryukyu Is.

O.R. A. Chase

37836 *Panicum segetum*

3 codominant

3 37 *Cyperus* ^{Guarrapata} Thunb.
very local2 38 *Monochoria*
very local6 39 *Vigna* ^{Arachis} (Tayu) Linn.
common1 40 *glochidion*
in dense Pandanus
thicket5 41 ~~(grass)~~ ^{edge of bog} ^{edge of bog} ^{edge of bog}same - lobe of
higher grassland
extending into bog.5 42 *Fimbristylis distichotoides* (L.) Vahl
common5 43 *Fimbristylis*
occasional2 44 *Hedysotis*
rare3 45 *Torenia*
occasional2 46 *Hypericum japonicum* Thunb.
rare5 47 *Aneilema*
common5 48 *Curculigo orchioides* Gaertn.
common

ISRICAKI ISLAND.

63

bluish green, culms
erect.extensively twining;
flowers yellow, bell
bent upward but not
twisted.tree or large shrub,
fruit ripe and shattering,
flowers yellow, almost
gone.

360 m.

flowers purplish

flowers yellow

64

1956 Ryukyu Is.

37849 50 Cyperus ^{open land} 0-5 m.
in wet spot

5 50 Euphorbia ^{common} 1-2 m.

5 51 Dioscorea ^{common} 1-2 m.
in edge of small thicket

1 52 Cyperus ^{open land} 0-5 m.
rare

3 53 Melastoma ^{occasional} 1-2 m.

9 54 Scleria ^{loc. Rty.}

July 1 - 1 km. E of Ishigaki City 20 m.

5 55 Diospyros ferrea var. ^{inflata} 1-2 m.
growing around ancient tombs

ISHIGAKI ISLAND,

65

erect with arching tips;
flowers white.

flowers at first white,
then purple.

flowers rose pink

erect compactly branched
tree 3-4 m. tall, fruit yellow.

July 3 - 1.6 km. w. of Ozata

(191)
(Photo
950-6)

Large peat bog, open
grassy, with no reeds.
Panicum and *P. sachne*
more abundant in proportion
to *Leersia* than in the other
bog. Surface mat in
most places flexible.
~~Also~~ *Andromes* thickets
around edges. These
have some *Gleichenia*
and are tangled
with *Lygodium*
scandens. Their vary
much in density and
from 1-4 m. in height.

This bog has a much
less abundant and less
varied sedge flora. *Fimena*
is the only common sedge.

The bog is fed by seeps
from the "gravel" terrace
around it. These are
abundantly peat covered.

The bog is in some
spots a true quaking bog.
Cattle grazing in it

7 thickets on steep
slopes and in ravine

<i>Ficus erecta</i>	
<i>Mallotus</i>	<i>Melia</i>
<i>Morus</i>	<i>Melanolepis</i>
<i>Raphiolepis</i>	<i>Pandanus</i>
<i>Cunya</i>	<i>Cerbera</i>
<i>Symplocos</i>	<i>Erodia</i>
<i>Claeagnus</i>	<i>Ficus vugata</i>
<i>Smilax</i>	<i>Ficus sp.</i>
<i>Calophyllum</i>	<i>Cyathia</i>
<i>Myrsinacenda</i>	<i>Phyllanthus</i>
<i>Rhus succedanea</i>	
<i>Glosshidion</i>	<i>Ampelopsis</i>
<i>Micantus</i>	<i>Bischofia</i>
<i>Mallotus</i>	<i>Anisopteris</i>
<i>Panicum</i>	<i>Alocasia</i>
<i>Dityplum</i>	<i>Xanthoxylum (var.)</i>
<i>Andries</i>	
<i>Collicarpus</i>	<i>Avenga</i>

(192)
(Photo
950-4)

(193)
(Photo
948-8)

Wendlandia
Ficus retusa
Micantus
Mallotus
Panicum
Dityplum
Andries
Collicarpus

(194)
(Photo
950-6)

stream bank thickets

<i>bamboo</i>	<i>Pipturus</i>
<i>Barringtonia</i>	<i>Boehmeria</i>
<i>Morus</i>	<i>nigra?</i>
<i>Musa</i>	<i>Ficus sp.</i>
<i>Pterocarpus</i>	<i>ribbed fruit</i>
<i>Cipresennus</i>	
<i>Ficus</i>	<i>Macaranga</i>
<i>Cerbera</i>	
<i>Ficus retusa</i>	
<i>Arundo donax</i>	
<i>Bischofia</i>	
<i>Ficus sp. wightiana</i>	

July 3. 3.5 km. w.w. of Miyama
w. of Mizu Dake, n.n.w. of Kawabe
37856 *Cyathia* ^{just above base of trunk}
common in thicket in
ravines

5 57 *Callicarpa*
occasional in thicket
in ravines

July 3 - 1.6 km. w. of
Ogata, upper Miyama
Valley
in thickets along banks of stream
5 58 *Ficus* ^{angular} ^{varia}
common
5 59 *Diospyros* ^{too numerous to list}
occasional

same - steep slope
on dissected alluvial terrace
5 60 *Eurycoma japonica* (Thunb.) Hand.
commonest shrub in thicket
5 61 *Anthrazan* ^{hispida} var. *cryptothecum* (Harms)
occasional in grass
5 62 ~~Sorghastrum~~ ^{Sorghum} ^{var. vulgare} (L.) Beauvois
common in grass beside
the road
5 63 ~~Sorghastrum~~ ^{Sphenoclea} ^{tonnifolia} (L.) Beauvois
common on road cut wall
1 64 *Cassia minosa* ^{C. fistulosa} ^{var. minosa} (L.) Beauvois
rare in grass

40 m.

with trunk
tree, 3 m. tall, leaf scars
prominent, varied in size
and shape, 3 leaves from
same plant; scales
on stipe golden-tawny.
erect shrub 2.5 m. tall,
flowers lavender, fruit purple.

small tree, fruit orange
small tree, flowers white

40 m.

shrub 3 m. tall ripe
fruit reddish, fleshy, delicious.

erect

flower yellow

same - ^{grassy} peat bog

37865 *Phyllanthus*
edge of bog, rare

66 *Passiflora* common on edge of bog

67 *Pandanus* forming thickets in bog

July 3 - Ishigaki Airport
e. of Hirak

5 68 *Ipomoea* ^{hard-shelled (pung.) seeds}
common in cultivated field

July 4 - west side of Kabira peninsula, 1.7 km. w. n. w.
of Kabira

Below the present beach is a long strip of very marsh-eroded beachrock forming an erosion ramp. This is a conglomerate including many non-limestone pebbles of various sorts. It shows evidence of moderate abrasion and some solution but no small planes.

tree & m. tall, fruit yellow, fleshy base of segs greatly swollen.

40 m. twining, flowers white

There is a low beach ridge of sand, with an irregular somewhat discontinuous scrub of:
Pandanus
Dodonaea
Clerodendrum inerme
Icaevola
Wikstroemia

Below this on the beach is a thin mat of *Lippia nodiflora*, *Thunbergia*, *Ipomoea pes-caprae*, *Ixeris*, *Ipomoea littoralis*, *Spirifex*, *Euphorbia chamaesyce*, etc.

Back of the beach ridge is a flat, partly open with thin grass and small shrubs. The grass is largely *Imperata*, but with several others intermixed. Prostrate *Hibiscus* is abundant locally. shrubs are *Psidium*, *Pandanus*, *Clerodendrum*, *Glochidion*, etc.

Part of the flat has a patch of woods. This is of *Ficus*, *Bischofia*, *Hibiscus*, *Pandanus*, *Celtis* (?), *Macaranga*, *Prema*, *Melanolepis*, *Pisonia umbellifera*, *Diospyros maritima*, *Pouteria* ~~ficus~~ *wrightiana*.

Undergrowth of *Allophylus*, *Alocasia*, + esp. *Glochidion*, *Munroa*, *Garcinia*.

On limestone outcrop *Ficus wrightiana*, *F. pingata*, *F. erecta* and *Arenaria* are added and common.

vines *Piper*, *Toddalia*

Up in forest just back of beach. Mainly a grove of *Calophyllum* but with a few trees *Fernandia*, *Hibiscus*, *Ditrygium*, *Raphiolepis*, *Callicarpa*. There is merely a small enclosure of rocks with incense burners.

The reef flat in front of the low erosion ramp is flat and sandy. A large stiff *Codium*-like green alga is common. ~~Entada~~ *Halophila*, *Thalassia* and *Cymodocea* form thin mats of rhizomes under the sand, their leaves protruding.

July 4 - ~~17~~ West side
of Kabing Peninsula, w. of Shiohi
1.7 km. w. n. w. of Kabing, Mori

37369 *Callicarpa* 1 m.
3 edge of shrive forest back of bay
5 70 ~~Calocedrus~~ *Calocedrus* ^{odifolia} *pinifolia* (Miki) den Hartog
on flat sandy reef flat det. C. den Hartog 1 m.
5 71 *Halophila* ^{avicularia} (L.) Hartog det. 1969 1 m.
on sandy reef flat C. den Hartog
3 72 *Pisonia umbellifera* (Forst.) Seem.
common in forest back of beach 2 m.
5 73 *Dodonaea viscosa*
~~common~~ abundant locally on
sandy beach ridge 2 m.

July 4 - south of Kabing

2 74 ~~(Moff.)~~ *Trichostema australasicum* A. Rich.
rare in edge of thicket 10 m.

small tree 4 m. tall, slender
flowers lavender.
forming a thin sod,
rhizomes buried; sterile.
forming thin sod,
rhizomes buried; sterile.
tree 8 m. tall; flowers white.

2 m. low bush 0.7 m. tall

twining in trees,
petals bright yellow,
filaments bright red.

July 5 - 2.3-3 km. s.e.w. of
Hirakubo

(196) Photo 945-86
Two conical hills
with Cycad scrub.

197 Sparse pine woods of
grassy foothills

198 Patch of wood has been
cleared except scattered
trees and an extensive
set of farm buildings
built in edge of it.

(199) This patch is now in
sweet potatoes

(200) Post miocene limestone
outcrops, the small ones
dominated by Cycas, the
larger by Ficus spp.

(201, 202)
(Photo 949-91)
These grassy slopes have
been freshly burned - still black.

(203) Mangrove swamp, the
lower part all Rhizophora
4-5 m. tall, the upper
part Excoecaria with
undergrowth of Randelia,
some Brunquiera in uppermost
part.

(204) ~~205~~

Forest on post-miocene
limestone

(205) Valley bottom forest
has Barringtonia and
Ficus, etc. but not
swampy, growing on
broad, not very braided
stream bed. ⁱⁿ
Farther up much dwarf bamboo.
Climbing the ridge
on the left side up to
the main central ridge
between 2 falls the
slope is steep, all
vision is cut off by
an undergrowth of
large clumps of Ardisia.
It is possible to go
through this with a
little cutting.
So far as could be
seen the forest here
~~was~~ is principally
Ficus and some
Diospyros maritima.
Much tangled with
Flagellaria and similar.

On the ridge top the Ardisia
thins out.
Much Ficus, Diospyros, and

Rhus

Undergrowth of Croton, Psychotria, Diaphorinia saplings.

Up to 100 m. or more there has been considerable cutting.

On up to 200 m. in steep slopes and ridges with mixed forest with considerable Areca and various shrubs in undergrowth, much Smilax, Flagellaria, and other vines.

By about 200 m. there is some Quercus but more Diaphorinia, Lauraceae, Ardisia, etc.

Ferns very common here. Stature of forest 8-10 m. trees up to 20-25 cm. dbh. crooked.

On top of first peak is scrub forest about 5-6 m. tall, fairly dense canopy tree up to 10 (or 20) cm. dbh. Little undergrowth, incl. some ~~some~~ Dammaraceae, Ilex, Eugenya, etc. Trees are ~~some~~ Poiteaia, Dendropanax, Cinnamomum, Viburnum, ~~some~~ Ardisia, Raphiolepis etc.

Tangled with Elaeagnus.

In saddles only a little lower, the forest is about twice as tall, with big banyans and considerable oak. Some recent cutting in this area.

Ridges and upper slopes generally with small wood, dug out some time ago. Old mine workings on ridges with pyrite in debris.

On a high east
~~west~~ slope below
 a ridge crest of
 dense low wood
 about 4 m. high
 trees to 5 (to 10) cm. dbh.
 like
Cinnamomum
Andisia etc
 tangled with
Lomelax, *Elaeagnus*
 etc.

Below this to s. ^{is}
 is mixed forest with
 little or no oak.
 Much *Andisia*,
Caesalpinia, *Diospyros*
 some *Podocarpus* (small)
Chrysophyllum.

Andisia, *Diospyros*
 abundant downward
 more and more
Ficus and *Garcinia*

In lowlands along ^{grass} ~~grass~~
 stream is thick
 forest clear out to
 beach on east coast
 Here *Hernandia* goes
 unusually far inland.

Along the coast
 southwestward there
 is wood on the ^{low} ~~low~~ ^{low}
 cliff. Back of this
 is generally *Imperata*
 grassland on the terrace
 and in places well
 up the steep mountain
 slope.

82

1956 Ryukyu Is.

July 5 - Yassa-Kawa
e. side of north peninsula.37875 (comb.) ~~copra~~ in ~~commun~~ b.
5 lowland thickets along
stream.1 76 *Nypha fruticans* Thunb.3 77 *Antidesma*?
occasional on upper
slopes of drainageJuly 5 - ~~ridges~~ ridges
north of Matsuyama
in thick moist forest3 78 *Psychotria*
common in undergrowth2 79 *Neolitsea*
occasional ~~in~~2 80 *Bescheania* ~~racemosa~~ S. & Z.
common locally3 81 *Flex* ~~aculeata~~ ~~Lea~~
common on ridge top1 82 *Malaxis*
rare4 83 ~~(x)~~ *Polypodium* ~~lunatum~~ ~~Thunb.~~
climbing on tree trunks, rare5 84 *Angiopteris* *erecta*
occasional

Ishigaki I.

83

mucil. branched herb,
dish greenish yellow.fruit picked up on beach,
not known growing
on Ishigaki or nearer
than Iriomote, where
it is very rare.12m. (7) ~~on~~ ~~habitat~~ (only 1 m. off)

150 m.

300 m.

shrub 0.3 m. tall,
flowers greenish white,
fruit red.

shrub, fruit immature

~~large~~ springy extensive
liana tangled in
low trees; sterile.
small slender tree,
fruit immature.rhizome small, globos.,
frond 1.2 m. long.

84 1956 Ryukyu Is.

77885 (bird) *lunaria* L. 300m
7 on tree trunk
6 86 *Daphniphyllum*:
common
1 87 orchid
rare on tree trunk
3 88 *Damnacanthus*
common locally
2 89 *Pyrosis*
common climbing
on tree trunks

Kara Gawa,
July 5 - stream 2 km.

2 90 *Filicosepium*
rare on low rather dry
wooded ridge
3 91 *Asclepias curassavica* L.
rare along trail
7 92 *Kandelia kandel* (L.) Merr.
common, forming under-
growth in edge of ~~edge~~
upstream part of mangrove
swamp
4 93 *Raphiolepis*
common on low limestone bluffs
5 94 *Adiantum*
in crevices in overhanging limestone
3 95 *Peperomia*
in crevices in overhanging limestone

ISSEIGAKI ISLAND.

85

330m leaves terete, perianth
green, purplish tinged
lip ~~so~~ dark maroon
purple inside, green tipped.
tree, cut for lumber.
350m low bushes 0.6-0.8 m. tall,
flat topped.
closely appressed to
trunk, fertile fronds
rare, all fronds thinly
fleshy
60m branched herb 0.5 m. tall
fruit red, fleshy
5m erect herb 1 m. tall,
flowers with corolla red,
corona orange.
shrub ~~so~~ 1-2 m. tall,
flowers cream white
3m. shrub 2 m. high,
spreading, diffuse, fruit
immature.
1-2m
95 diffuse, fleshy.

July 7 - north of Iriomote
 Thick scrub of
Premna, *Hibiscus*, *Ficus*
wightiana, *Toddalia*,
Psidium, *Pittosporum*,
Carronia, *Pandanus*,
Ficus erecta, *Zanthoxylum*
 (small), *Alpinia* species,
Cycas, *Morinda*, *Murraya*,
Mallotus, *Pipturus*, *Paphiopedilum*,
Allophylus, *Arenaria*, *Misanthus*,
 tangled with *Ampelopanax*.
 This scrub is 2-4 m tall
 and grows on low
 ledges of rough limestone.

Back of it is a considerable
 area of rock pasture
 dominated by *Psidium*,
 short *Imperata*, *Artemisia*
vulgaris, *Rosa*,
Lespedeza.

A little seawards
 around brush patches
 even well inland
 in the rock pasture.

Seaward of the
 road is a more
 typical littoral scrub
 at a sand ridge dominated
 by *Dyera*, *Premna*,
 and *Pandanus tectorius*,
Morinda, *Allophylus*,
Zornia, *Casuarina*, *Ficus*,
Retusa, *Calophyllum*.

(206)
 (Photo)

domates
 Semios
 Semios
 de.

(207)

(208)

as scattered trees. *Vitis*,
Toddalia, *Zanthoxylum*,
Carronia, *Thyrsanthus*, *Rosa*,
Psidium, *Wikstroemia*,
 as secondary shrubs.
Imperata, *Artemisia*,
 (green), *Zygia* as most
 important herbs.
Cotinus, ^{sporadic} some *Euphorbia characias*.

This scrub varies from
 dense and 2 m. tall to
 very sparse and 1 m. or less.

1

July 7 - s.w. of Ozato

Rounded hills of schist, mostly grassy, with occasional clumps and patches of pine, especially of pine seedlings.

One of the hills, mostly well wooded. Viewed from a short distance through binoculars, the forest presents the appearance of a very dense mixture of many species with no one of them dominant. *Ficus* common.

Around the base, on the north side, is a dissected alluvial terrace, the ravines with paddy fields in their bottoms, but with patches of wood in their narrow heads and side branches.

These ravines have a flora of small trees and large shrubs.

(209)

(Photo 945-14) *Rhus succedanea*,
Morus, *Lymplocos* sp.,
Ficus 4 sp., *Archeflers*,
Distylium, *Premna*,
Macaranga, *Raphiolepis*,
Pandanus, *Trema*, *Lauraceae*,
 a *Carya*-like sterile tree very common
 also the opposite leaved

Arenga, compound lfd. tree, *Mallotus* *panniculatus*, *Phyllanthus*, *Mallotus* sp. (glaucous), *Elaeocarpus* *japonicus*, several other unidentified trees.

Flagellaria, similar *Vitis*, etc. not too common, *Alpinia speciosa*, *Cygodium flexuosa*, etc. abundant margins.

The alluvial terrace is covered by dense *Imperata* grassland, with scattered pines.

The forest on the hill itself has

- o *Glochidion*
- o *Melanolepis*
- o *Ficus* (ribbed p.)
- c *Rhus succedanea*
- o *Lymplocos* sp.?
- c *Bischofia*
- o *Ficus virgata*
- c *Arenga*
- o *Evodia*
- c *Lauraceae* (*Macaranga*?)
- o *Ophiorrhiza*
- c *Mussaenda*
- lc *Pisonia aculeata*
- c *Lasiandra*
- c *Mallotus pinnatus*
- o *Pachmeria*

2. ~~Pterospermum~~^{carpox}
 Ficus sp.
 c Psychotria
 c Flagellaria indica
 o Garisma
 ~ Clerodendrum trichotomum
 be Ficus retusa
 c Andisia
 o Angiopteris evecta
 c Castellia japonica
 o (tree with axillary
 fruits and thick pedicels)
 c Diospyros mactiana
 c Morus
 c Premna obtusifolia
~~Gonosanthus~~
 o Croton
 c Neolitsea
 ic Ternstroemia
 o Antidesma
 o Mallotus philippinensis
 ~ Glaucocarpus japonicus
 ~ Pouteria
 ~ Gueraea cuspidata (var. m?i)
 ~ Morinda umbellata
 ~ Randia or Diphlospadix
 ~ Maesa
 ~ Cudrania?
 ~ Ficus sp.
 ~ Clerodendron
 o Callicarpa formosana
 o Macaranga
 o Schefflera

Frequent trees

(also climbing in giant
 Ficus retusa, occasional
 on upper north slope)

The general stature
 of this forest is about 6-8 m.
 with occasional trees
 much higher.

Undergrowth varies
 but generally rather
 loose except in open spots
 where it is thick.
 ferns very common,
 on ground, especially
 on north slope.

Oryctium, brown hairy,
 Dryopteris (?), Festaria
 common, Asplenium nidus
 occasional.

Ophiopmenus and the
 large Ophiopmenus-like
 grass common underfoot.
 Alpinia sp. the white
 ground orchid, the spiral
 Calanthe, and sarcandra
 occasional.

92

1956 Ryukyu Is.

Alsashita

July 7 - Upper Mizara Bridge
in wooded flats along
river.37996 (mud) ~~Trichosanthes~~ ^{Trichosanthes} ~~fructuosa~~ ^{fructuosa} ^{var}
occasional in secondary
growth.3 97 (bamboo)
common98 orchid
common in silty soil
under treesJuly 8, Hills southwest
of Izato ^{Kafuta}
in rather low scrubby
forest on ~~desert~~ soil.99 (orchid)
occasional37900 Ponteria? ⁸
rare.6 01 Diplosporus ⁷avena
rare5 02 Maesa ⁷avena
occasional5 03 Morinda ⁷avena
rare5 04 Diplosporus ⁷avena ^{gynandra}
rare

18 ISHIGAKI ISLAND,

20 m.

93

vine, tangled in bushes,
ripe fruit bright orange,
pulp and seeds greenish black.1 - to - ninate,
vigorous to
15 m. tall,
lower branches
spiny,
aber globose
broad
separate

PLANTS OF THE RYUKYU ISLANDS

ISHIGAKI SHIMA

short shrub to tree to Kew under
Bambusa
Locality Alsashita upper Mizara Bridge in
wooded flats along river. 10m

Occurrence Common

Date 1956 Alt. 20 m. (from map)
Coll. F.R. Fosberg No. 37897
rhizome determinate, culms from
Remarks contiguous to 20 cm. apart, erect,
to 15 m. tall, dark green, lower branches
sparse not spring.

Pacific Vegetation Project

unbranched,
ver white.small tree 6 m. tall,
fruit immature
bush 2 m. tall, slender,
fruit green.shrub 2.5 m. tall,
fruit immature.scandent shrub,
climbing in trees.shrub 2.5 m. tall,
fruit with 2 peltate seeds
in a cell, not immersed
in placenta, immature

PLANTS OF THE RYUKYU ISLANDS

ISHIGAKI SHIMA

I sent up 7 trees to Kew under
Bambusa

Locality Alsashita upper Mizara Bridge in
wooded flats along river. 10m

Occurrence Common

Date 1956 Alt. 20 m. (from map)

Coll. F.R. Fosberg No. 37897

rhizome determinate, culms from

Remarks contiguous to 20 cm. apart, erect,
to 15 m. tall, dark green, lower branches
sparse not spring.

Pacific Vegetation Project

92

1956 Ryukyu Is.

Akashita

July 7 - ^{Arkansas} Upper Mizara bridge
in wooded flats along
river.

20 m

37896 (~~unpubl.~~) Tachysphex (matul.) Vivaldi
occasional in secondary growth.

3 97 (bamboo)

common

98 ~~admir~~ common in silty soil under trees

Kafuta,
~~Adolescent home~~

July 8, hills southwest
of Gyato
in rather low scrubby
forest on a schist so

99 (actual)
occasional

37900 $\frac{8}{8}$ Portaria? rare.

6 01 ~~Diplosporaa~~ ^{Parasporaa} ~~arenaria~~
~~arenaria~~

502 Maesa *boninensis* 11

occasional
occasional

5 03 *Morinda umbellata* L.

5 04 ~~Hibok~~ rare

5 04 Diploptera Tarenna gigantea var lutea
rare

ISHIGAKI ISLAND,

93

in, tangled in bushes,
ripe fruit bright orange,
pulp around seeds greenish black.
rhizome determinate,
culms from contiguous to
20 cm. apart, erect, to 15 m. tall,
dark green, lower branches
sparse not springy.
fruit green; tuber globose
soft, fleshy; broad
leaves ~~seen~~ on separate
young plants.

120-150 m.

stem erect, unbranched,
1 m. tall; flowers white.

small tree 6 m. tall,
fruit immature

bush 2 m. tall, slender;
fruit green.

shrub 2.5 m. tall,
fruit immature.

scandent shrub,
climbing in trees.

shrub 2.5 m. tall,
fruit with 3 peltate seeds
in a cell, not immersed
in placenta, immature

94

1956

77905 *Ficus exstip.* Bl.
3 rare

6 06 *Trema australis* Bl.
rare in wooded ravine

2 07 *Vitis laeata* Benth.
common in wooded
ravine.

~~July 7~~ just north
of Shiraha

5 08 *Allophylus* (DC.) Bl.
common in scrub on
broad sand ridge

6 09 *Morinda citrifolia* var. *bracteata*
common in scrub on
broad sand ridge

5 10 *Premna obtusifolia* R.Br.
common in scrub on
broad sand ridge

11 ~~ftodays?~~
common on ~~calcareous~~
outcrop in grassy
pasture.

1956 ISLAND.

95

small tree, sterile.

small tree, ripe fruit
~~dark~~ purplish black.
vine climbing on trees.

10m.

shrub 1 m. tall.
flowers white, fruit yellow.

shrub 1.3 m. tall, flowers
white; fruit ~~yellow~~ greenish.
all individuals seen
were var. *bracteata*.

shrub 1 m. tall;
flowers pale green.
fruit ripening unevenly,
ripe ones black.

flowers pinkish purple.

July 8 - 2 - 2.5 km. e. of
Yoshihara
Well developed ~~the~~ littoral
forest on beach ridge.

West of this, forest on
pitted limestone, *Pontederia*
very prominent.

A few hundred m. west
of this is a lobe of reef
with reef flat about
150 m. wide. or more in
places. The reef flat is
about level but with
an irregular surface
with perhaps 1-2 dm
relief, covered by a few
mixed algal fms.

The reef margin is
almost dead with only
a few scattered small
corals in crevices, small
surge channels and other
protected places. The
exposed portions of the
margin and surface
a few m. back of it appear
abraded and a dull
pinkish gray color. It
is not much abraded, though,
but covered by a weak
growth of a smooth somewhat

Knobby Parolithus. It
is honey combed by small
holes. The Parolithon is
actually in thin layers,
1-2 mm., over-laying each
other, in places making
up the rock, elsewhere
on rock of other origin.
The whole, when broken,
is seen to be riddled with
boiling mollusks and
sipunculids. in a
cavity was found a
small gray, very active
spider. The cavity was
apparently silk-lined.

This is at least 1.5, probably
2 m. below high tide level.

There is very little
sand on this reef flat
only such as is held
by the algal fms.

The honey-comb effect,
really not honey-combed
but deeply channelled
with holes 2-3 cm. in
diameter which are
sinuous and go parallel
with the planes of the
reef surface then curve
irregularly downward.
appears to be due to a small

lavender to purple excentric
edimoid, roughly oblong
in shape. These could
be seen in the bottoms
of many of the holes.

July 8 - 2 km. e. of Yoshihara 20 m.
In dense broad strip of
littoral forest

37912 *Boehmeria* ^{forbesii} _{Hegi}
6 common along path
2 13 *Psychotria*
common in undergrowth
1 14 (asdy.) *Kanckia* ^{*berlandieri* H. & A.} _{canescens} A. Nels.
common near seaward
edge along trail
2 15 *Maesa* ^{*lanceolata* H. & A.}
common in undergrowth

shrub 1 m. tall;
fruit immature.
extensive twining vines;
flowers yellow-green.
shrub 2 m. tall, very
slender; fruit immature.

July 10 - Kobama Jima
 from sea on east or
 southeast side the
 island looks grassy
 with rather sparse
 woods scattered here
 and there. The woods
 on the ~~east~~ peninsula
 seem to be an open growth
 of pine. On the ~~west~~
 end are low bluffs
 with wind-sheared
 woods.

The two high hills
 are grassy with
 sparse brush. On their
 flanks are areas of
 bright green Imperata.
 Much of this in the
 low center part, also.

Patches of pine are
 conspicuous at middle
 altitude on ~~northern~~ part
 of island, as well as on
 the western peninsula.

Along coast a conspicuous
 barrier of littoral scrub
 or forest attenuating out
 along the base of the
 line of bluffs on the
~~west~~ end.

Paleozoic schist on
 quartz schist exposed
 near banding. Covered
 with Pandanus thicket
 with more and more
 Ficus inland.

Up a bit there is post-
 Miocene limestone -
 covered with Pandanus,
 Cyas, Melanolepis, Ficus,
 etc. Musa, Maraga,
 aranga.

Between the limestone
 outcrops is a fine gray-brown
 soil this is partly
 cultivated - sugar cane,
 sweet potatoes, - partly
 very weedy.

A few small paddies
 fields.

Slope of highest hill
 grassy with abundant
 Pandanus thickets.
 At base abundant
 fragments of schist.

There are 3 hills of a
 shale or rotten schist,
 all about the same
 altitude. all grassy on
 top but top surrounded

List of plants seen on
island:

Casuarina
Pencaena glomerata
Pandanus
Acacia confusa
Hibiscus tiliaceus
Cycas
Imperata
Premna
Calophyllum
Miscenthus floridulus
Codium guajava
Lycopodium plexus
Induvia
Vernonia cinerea
Emilia sonchifolia
Alocasia
Murraya
Ficus heterophylla
Ficus wightiana
Alpinia speciosa
Ampelopsis
Melanolepis
Nelumbo
Glechoma
Boehmeria nivea
Eupatorium
Areca
Cardiospermum
Gymnura
Artemisia vulgaris
Artemisia

Diospyros ferrea
Prunus luchuensis
Angga salvifolia
Blumea (both spp.)
Mussaenda
Ficus erecta
~~Fitchia~~
Bidens pilosa
Pueraria
Ardisia
Machilus
Scadraola sericea
Pipturus
Dianella ensifolia
~~Ficus retusa~~

by thickets (on east hill only) of *Pandanus*, *alpinia*, *macilenta*, *Muscarellia*, *Pandanus*, *Cyrtos*, *Alocasia*, *Eurya* etc.

On the side facing Iriomote is a broad terrace, almost all under cultivation. The village is on the east side of this. Between the village and the sea is a lower terrace, also under cultivation.

Cultivation seems mostly cane and sweet potatoes.

Small clumps of forest scattered here and there, pine, broad-leaf, or mixed.

The terrace north of the 3 hill, also, is largely cultivated and has a scattering of wet grassy fields.

The foothills back of this terrace are grassy with *Pandanus* thickets.

Pandanus thickets are the most widespread feature of the vegetation

of this island. Every pine grove has an understory of *Pandanus* scrub.

The little flat island north of Kobama has 3 imperative with scattered *Pandanus* thickets.

Near the landing the rock is splint but cut by dikes of volcanic material. West of the landing, along the shore, is an exposure of another kind of volcanic rock.

July 10 Taketomi

Rubus rosifolius (?)
Erythrina - deikos

The south end of the island is a scrubby area mostly in *Imperata*, outcrops of limestone, the large ones with thickets of *Cycas*, *Acacia*, *Foddiaria* and various shrubs - *Morus*, *Musa*, *Premna*, *Miscanthus* etc. occasional field cultivated - many beans, sene, etc. Most have been cultivated in the past but abandoned. Many stone walls in poor repair.

Perhaps 10% of land cultivated now.

Limestone outcrops everywhere.

The seaward edge surrounded

by concentric belts of *Leucaena* and littoral forest or scrub.

A small shade grove in south village has 1 tree each of *Ficus retusa*?

Ficus neogata, *Porteria*, *Machilus*, and *Garcinia*.

A pleasant cool spot.

Another near the north end has *Garcinia* and *Hibiscus tiliaceus*.

The large conspicuous grove at the south end has a number of enormous old *Calophyllum* trees, many of the largest *Garcinia* on the island, great *Hernandia*, *Diospyros*, *Ficus retusa* (no tree at gate).

It is cool, quiet and most impressive inside the grove, while sizzling hot outside.

Along reef from north end to pier and a series of outcrops.

First is a series of schist dipping toward the big chest outcrop offshore. A big chest boulder lying on top of this.

Then more schist outcrops scattered along the reef, emerging through the present reef flat.

Then a short series of outcropping beds of a conglomerate including paleozoic fragments. Quite variable in texture.

July 10 - Taketomi Shima

~~village~~ ^{Hayama} ~~Taketomi~~ Village

37916 *Annona* ^{squamosa} L.
cultivated

5 17 *Thalassia hemprichii* (Ehrh.)
in sandy pools on reef flat

5 18 *Garcinia spicata* Hook. f.
in grove around shrine

0 m.
Asches in Petermann det. C. den Hartog 1969
sterile

tree; fruits green, some exuding yellow latex.

110

1956 Ryukyu Is.
~~village~~ Hatazawa Village

37919 5 Ficus retusa var.
in grove around shrub

5 10 Ficus virgata ^{Reinw.}
in grove around shrub
nakasiji,
south central part of
Solanum ~~verba~~ ^{folium} L.
edge of cultivated patch
in small thicket

2 22 Erythrina ^{variegata} var. ^{variegata} (L.) ^{variegata}
scattered in waste land

1 23 Achyranthes ^{spicata}
rare in waste land

3 24 Conyza bonariensis
common in recently
abandoned or fallow fields

2 25 Rubus ^{pruriens} var. ^{trifoliata} (L.) ^{Nakai}
common on limestone
outcrops

2 26 (ab.) ^(ab.) ^{Artemisia} ^{indica} (L.) ^{Nakai}
occasional on pockets
of soil on limestone outcrops

3 27 Artemisia capillaris ^{Thunb.}
very common on waste land

28 Berchemia ^{lanceolata} DC.
common on base limestone
outcrops

20m.

island
10 m.
†

Taketomi I.

111

large tree, all leaves small,
fruits deep maroon purple.
large tree, ~~all leaves~~
~~fall~~ branches drooping
at tips; fruit immature.

shrub 2.5 m. high,
fruit immature.

tree 3 m. tall

much branched herb,
flowers greenish.

stems prostrate to
ascending.

past flowering.

prostrate spreading
scandent shrub,
ripe fruit blue-black

July 10 - Kobama Jima,
Funabashi

3-5m.

37929 5 *Pandanus*
forming thickets along beach

3 30 *Sphenomeris chinensis* (L.) Merr.
abundant on vertical
road cuts

3 31 *Melanolepis multiglandulosa*
common on limestone

3 32 *Mallotus* ^{sp. nov. n. sp.} H. A.
common on limestone

6 between O Take and
Funabashi

30-60m.

3 33 *Pipturus arborescens* (L.) C. Chr.
occasional in
thickets on limestone

5 34 *Ficus wightiana*
occasional in thickets
on limestone.

2 35 *Cycas revoluta* Thunb.
common on limestone

3 36 *Digitaria* ^{sp. nov. n. sp.} H. A.
common in cultivated fields,
limestone soil

37 (grass) *Lepidochloa pauciseptata* (Berg.) H. A.
common in cultivated
fields, limestone soil

38 (grass) *Brachyelymus pumilus* (Berg.) H. A.
common in cultivated fields,
limestone soil

shrubby tree 3 m. tall,
fruit orange-red.

fronds appressed to
bamboo [likely that this small less
finely divided coriaceous tree deserve
some sort of name. It is probably the little tree of] C. V. Meek

shrub 2.5 m. tall.

shrub 2.5 m. tall

shrub 1.5 m. tall,
~~petiolate~~ carpels forming
a globose mass,
hiding the seeds within.

114

1956 Ryukyu Is.

37979 1 37979 *Phyllanthus simplex*
local in edges of
cultivated fields

2 40 *Euphorbia hirta* L.
common weed in
cultivated fields

3 41 *Ficus septica* Burm. f.
common in thickets

3 42 *Ardisia sieboldii* Miq.
common in thickets

2 43 *Vitex trifolia* L. ^{syn. *Platycarya*}
common around
edges of thickets

1 44 (lab.) *Malva quadrata* Maxim.
rare in cultivated field

2 45 *Fimbristylis*
grassy edges of rice fields
and trail sides

3 46 *Cyperus* ^{var. l.} _{3-5 cm}
grassy ~~trailsides~~

2 47 *Urania* ^{caerulea} Dru.
rare on grassy trail sides

4 48 *Goodenia* ^{monilifera} (Lam.)
rare along grassy trails

2 49 (spans) *Goodenia intermedia* (Lam.)
rare on edges of rice fields
Botanical station (Rob.) A. Camus 3000 ft
same *Goodenia lobata*

4 50 *Diaphyrosferrea*
around tombs on
limestone outcrop

5 51 (spans) *Melochia corchorifolia* L.
weed in cultivated fields

Kobama I.

115

small tree; fruit
immature, depressed
globose, ribbed.
Shrub 2 m. tall;
flowers white
shrub 1 m. tall;
flowers blue lavender

flowers rose-purple
caespitose

tree 5 m. tall, compact,
fruit yellowish.
flowers purplish pink

116 1956 Ryukyu Is

37952 *Emilia sonchifolia* (L.) DC.
weed in cultivated fields.

2 same - Funai Saki
on metamorphic rocks
in full sun.

4 53 *Portulaca oleracea* L. ?
common

4 54 *Phyllanthus urinaria* L.
common

same - O Take
hill of soft schist

4 55 *Lycopodium flexuosum*
common in thickets

2 56 *Ficus erecta* var. *beccariana* (H. & A.) King
occasional in thickets
on slopes

3 57 *Dianella ensifolia*
common on slopes

3 58 *Eurya*
common on slopes

3 59 *Carmona retusa*
common in thickets on slopes

3 60 *Ficus erecta* Thunb.
common in low thickets
around summit

1 61 *Ardisia* sieboldii Miq.
~~in low~~ ~~on~~ summit
in low thicket

4 62 *Machilus* ? - ^{theobolifolia} S. & Z.
on summit, common

5 63 *Mussaenda* ^{prolificiflora} S. & Z.
in thickets around summit

3 m.

Kobama I.

117

plant fleshy, bronzed;
petals deeply bifid,
15 mm. long, yellow.

75 m. fronds extensively
wrinkled

flowers light blue

shrub 1 m. tall;
ripe fruit black,
arching bush; ripe
fruit orange-red

98 m. shrub 1 m. tall. ripe
fruit dark purple.

shrub 2 m. tall,
flowers white.

shrub 2 m. tall;
sterile

shrub 1.5 m. tall,
flowers with yellow
corolla, white enlarged sepal.

118 1956 Ryukyu Is.

37964 *Eupatorium formosanum* (Berg) ^{quadrangular (Aug)} _{1-2 dm. tall}
2 common on grassy summit
2 65 ~~Vaccinium~~ ^{indistinct name} tangled in thickets
on slopes
2 66 *Psychotria serpens* L.
on slopes
2 67 *Fimbristylis* ^{in栽培 (Aug)} _{herb} common along trail
in grass

Kobama I.

119

erect herb 0.8 m. tall,
flowers whitish
with honey-like odor.
flowers brownish.

scandent shrub.

caespitosa

120

1956 Ryukyu Is.

July 12 - 2 km. north of Ishigaki City 60 m

grassy abandoned paddy field

37968 *Fimbristylis distichia* (L.) Vahl
common49 (grass) *Ischaemum* sp. (L.) Vahl
occasional70 *Ischaemum* sp. (L.) Vahl
rare around edges5 71 *Deschampsia* indica
dominant locally in

1371941 ISLAND,

121

on S. W. face

erect much-branched
herb to 1 m. tall; flowers
greenish yellow, marked
outside with brown.

July 13
north of Hua Tien

(210)
(photo
940-42)

low forest about 4-5 m.
high. Composition:
Premna obtusifolia
Mallotus japonicus
Glossyodon hongkongense
Wendlandia
Erodia
Meesa
Elaeagnus
Glossyodon lanceolatum
Argania brasiliensis
Eugenia jambos
Andisia
Psychotria linkianensis
Diospyros maritima
Schefflera
Cassianthus 2 spp.
Arenca
Barringtonia racemosa
Ficus benjamina
Rhus succedanea
Larcandra
Angiospermae
Bridelia
Misanthus
Flagellaria
Lomilax
 Coppice form, several
ferns common on ground
Barringtonia and *Eugenia*
jambos particularly

ISHIGAKI ISLAND.

along streams.
land rather flat
with ravines cut
in it to about 2 m.
depth. Great angular
boulders in ravine
mostly diorite.
underlain by soft
conglomerate and
soft sandstone.

July 14 - just above Kaiman V.

(211)
(Photo
940-43)

Ravine forest -
very irregular
composition:
Mallotus japonicus
Ficus sp. (ribbed fruit)
Bischofia javanica
Boehmeria ?
Andisia 2 spp.
Flagellaria
Lomilax
Piper
Ficus sp.
Angiopteris
Arenca
Psychotria
Caesalpinia
Pterocarpus
Ficus (small sp. *virgata*)
Ficus sp.
Cyathea
Mallotus paniculatus

Maesa
Mussaenda
Rhus succedanea
Schefflera
Ficus retusa
Morus
Glochidion longicorne
Proodia
Celtis?
Cinnamomum camphora
Pouteria
Crataeva
Clematis
Mallotus philippinus
Clerodendrum trichotomum
Machilus
Garcinia spicata
Persea
Ficus virgata
Melanolepis

July 14 - just north of Kainan

Village upper Miyara Valley
thickly wooded ravines

37972 *Pisonia umbellifera* (Forst.) Scam.

5 73 *Ficus benjamina* Hayata
common

5 74 *Acacia pulcherrima* (Shrubby) Meissn.
common around edges

70 m.

small tree, fruit immature
large tree without
aerial roots, fruit
clusters on ~~large~~
branches, fruit almost
spherical, green.
shrub $\frac{3}{4}$ m. tall, very
brushy

126

1956 Ryukyu Is

17975 *Cinnamomum camphora* (L.) Nees & Eberm.
3 occasional

4 76 *Canavalia turgida* f. graham
occasional

2 77 *Solanum auleaticissimum* Jacq.
rare along trail

2 78 *Ficus benjamina* (= *F. religiosa* Willd.)
common

July 14 - 3 km. east of
Nagara

3 79 *Miscanthus floridulus*
common, this from
edge of thicket.

2 80 *Randia*? *Tacca aquatica* (L.) Willd.
rare in shrub layer

3 81 *Asplenium*
terrestrial, on roadside bank

2 82 *Elaeocarpus* sp. in fl. 2.
rare along stream

3 83 *Ardisia quinquegona* Bl.
occasional

5 84 *Saurauia tristyla* var. *oldhamii* (Hemsl.) Hartog
common along stream

5 85 *Bridelia*

37985a ~~conica~~ occasional.

→ *Ostelia alismoides* (L.) Pers. det. C. den
Hartog 1969

SEPIGAI ISLAND.

127

shrub 2.5 m. tall, aromatic
when broken; sterile;
leaves glaucous beneath,
extensive twining vine,
flowers ~~rose~~ rose pink;
pods inflated.

flower white; fruit
globose, scarlet

small tree, 4 m. tall,
figs globose, dark green, not ribbed.

75 m.

canes 2 m. tall, curved;
flowering out of season

shrub 1 m. tall,
flowers white, corolla
lobes somewhat twisted.

small tree, sterile.

slender shrub 1.5 m. tall, fruit
more or less pentagonal,
depressed globe.

spreading tree; fruit
borne on stems, white
and fleshy when ripe.

small tree, fruit greenish.

July 15 TCAT compound
+ km. west of ~~Naigus~~ ^{playa} ~~Naigus~~
planted ~~as~~ around building 2 m.
and in gardens.

37986 *Casuarina equisetifolia* L.
widely planted on island

3 87 *Gaillardia picta*
in garden ^{at} ~~Naigus~~ ^{Naigus}

3 88 *Acalypha amentacea*
var. williamsii (M.-A.)

3 89 *Codiaeum variegatum*, Bl.

July 15 - Nagura

Miscanthus condensatus
patch of *Hanguana* (?)
in small waddy
field ~~at~~ ^{near} in
small stream.

The plant forms a
solid stand about 2 m.
tall in soupy mud.

It is light green.
all sterile at this time.
spreads by hollow
septate rhizomes.

(212) North ^{west} of this is a
stretch of marsh
dominated by *Panicum*
repens, gradually
changing northward

trees 5 m. tall, (two trees
represented in specimen)
much branched herb,
flowers red and yellow
shrub 2 m. tall leaves
variegated, red, yellow
and green.
shrub 1.2 m tall, leaves
dark maroon-purple
and green, sterile.

& *Typha* and *Ischaemum*
with some *Panicum*
and a scattering
of 3 sp. *Cyperus*, *Lepturus*,
~~Cladium~~ *Cladium*, *Fimbrina*,
Fimbristylis, etc.

The soil seems to
be a sticky mud.
very little structure
preserved.

Locally are patches of
reeds. On higher ground
where it is almost dry
Imperata and *Miscanthus*
with *Artemisia* take over.

July 15 1 km.
north-west of Nagura

(215)
photo
400-79

Large area of
Marshes, marsh
with some patches
of reeds.

July 15 - 1 km. northwest of
Nagura
in paddy field, already
harvested

37985a *Otelia*? ~~abundant~~ ^{abundant} ~~submerged~~
abundant, submerged

2 86a *Spirodela polyrhiza* (L.) Schleid
common, floating

2 87a *Azolla* ^{indica} (L.) Willd. ~~indica~~
~~common~~ common, floating

July 15 - 1.5 km. s.w. of
Nagura
in marsh, growing
in deep stiff mud.

7 88a ~~Scoparia~~

common locally
abundant

4 90) *Timbristylis*
common

5 91) *Isachne glauca* (Thunb.) R. Br.
abundant

5 92) *Simpus valdivia* Vahl
local

flower pinkish white,
emerged.

mixed with *Azolla* ^{indica}

abundant
in water

1 m.

flowers white.

rhizome deeply buried

small ~~group~~ ^{tuft} of
erect stems, leaves at
right angles to stem.
stems erect subterete, soft
rhizome orange red, deeply buried.

37993 *Cyperus glomeratus* All
 5 common locally
 5 94 ~~Phragmites~~ *poa*
 common on sandy
 edges of marsh

July 15 - 2 km. S.W. of
 Nagura

1 95 ~~Hanjanan~~ *agrestis*
 large dense colony in the
 paddy field in deep mud.
 July 16 - 2 km. ^{10-20°} E. of marsh
 of Iwamus

Lower slopes are
 mostly cleared and
 in Imperata, *Artemesia*,
 etc.

(214) Lower forest is
Diospyros, *Indigofera*,
Morus, *Ficus*, *Daphniphyllum*,
Machilis? *Diospyros* ferns,
Styrax, etc.
 Small trees 4-5 m. tall
 up to 15 cm. dbh.
 Thin undergrowth,
 mostly *Psychotria*,
Eugenia, *Flex*? *Cunya*,
Lechina.

(215) Up the slope the
 stature becomes greater
 perhaps 5-8 m. Composition
 does not change much
 a few enormous ab.

densely creeping.

1 m.

2 m. tall, sterile.

round tipped spreading
 fronds on ~~slipper~~ ridges.
 Ferns and *Ligularia*
 fairly common.
 Ferns mostly *Pteris*
 and the brown hairy
Dryopteris.
 Undergrowth thicker
 and more diverse here.

Some viney ¹ fls, etc.
 throughout, but not
 many.

(216) Some *Garcinia*, *Mallotus*,
philippinensis, *Elaeagnus*,
Dendropanax, *Ficus retusa*,
 a few enormous *Machilis*
 (6-7 dm. dbh.), on higher
 ridge, first ~~garden~~ not

far from top.
 Large banyans
~~F. viginiana~~ & ~~F. retusa~~.
~~Ficus~~ ~~Croton~~
 becomes abundant in
 undergrowth, and
 near top, ~~F. Tectaria~~
 in fern layers.
 No epiphytes
 except a very few
Asplenium nidus.
 A little *Cladocarpus*
 on top, but no *Guercus*.
 Some *Mallotus philippinus*.

(215) Along the crest and
 where not cleared, down
 some way on the east
 slope is a dense scrub
 3-4 m. tall of *Distylium*,
Glochidion, some *Rhus*,
Mallotus, *Ficus*, *Artocarpus*,
Premna, *Elaeagnus*, *Cinnamomum*,
Eugenia, *Viburnum*, etc.

(216) The cleared east slope
 is largely *Miscanthus*,
 some of it 2-3 m. tall
 in sheltered spots.

In the scrub is little
 or no ground cover
 and little undergrowth
 but trees are spaced
 0.5-1 m. apart and

(216)

penetration is slow.

Going down ravine
 on ~~east~~ west side
 The first grade
 is very gentle
 and the bottom broad
 then a cirque-like
 springy place
 then rather steep
 grade and narrow
 rocky bottom.

Trees here are
 large, up to 15 m.
 Some enormous
 buttressed *Ficus*,
 & a caudiflorous
 species (late 37977).

Ferns profuse
 and luxuriant
 many species, all
 terrestrial. Some
 ariens.

Gardinia common
 & few large *Melandrepis*.
 Other species more or less
 as on slopes and ridges.
Ficus (ribbed) common in
 lower half. *Premna*.

Livistona only very
 young trees, scattered
 sparingly generally
 on this mountain.

Water only in upper part of ravine

222)

1956 Ryukyu Is.

July 16 - 3 km. S.E. of N. of Ibaruma
 On a knoll toward
 sea from mountains
 is a grove of - and
 Liristone with
 an undergrowth of
 Cypress and Pandanus.
 The palms are along
 the landward slopes
 of the knoll. Up the
 slopes they are replaced
 by a forest of Ficus,
 Macaranga, Ardisia,
 Liquidambar, Machilus,
 Diospyros, etc.
 with a thick shrub
 layer largely of
 young Liristone.
 Top of knoll a
 bush, Miscanthus
 and some Liristone
 a few Pines.

Psychotria general.
 Many palms have
 been cut presumably
 for the ^{young} leaves, as bases
 of petioles are abundant

July 16 - 2.5 km. S.E.
 Hiratsubo
 ravine on steep
 slope - has forest
 up to 15 m. tall, a
 few big trees
 mostly Ficus.
 with *Diospyros*,
 Macaranga, Ardisia

thick undergrowth
 of *Psychotria*, *Arenga*

Ferns abundant

Ridge S. of this
 has a scrubby
 dryer forest to
 3 m. tall with
Diospyros, ferns,
Ardisia, *Ficus*,
D. maritima, *Arenga*,
Rhus, *Lauracea*, *Garcinia*,
Arenga, etc.
 few ferns,
 some undergrowth
 of *Croton*, *Psychotria*,
Arenga, etc.
 But no *Quercus* & possibly
 150-175 m.

138

1956 Ryukyu Is.
back of Kida Sabi,
July 16 - 3 km. 15° e. of north
~~Hinakaba~~ Ibaruma

37996 *Livistona chinensis*
abundant on low knoll
on coastal terrace

41 m.

tree with straight
trunks 4 m. high, lower
part smooth, upper
1 m. showing rather
close set leaf scars,
trunks with a distinct
"bark" about 1 cm. thick,
leaves with narrow
free tips of segments
drooping, fruit
immature but
possibly about full
size, ellipsoidal.
(most trees in grove
not fruiting) (leaf-
bases with stipules
not from same tree - they
are from young leaves
harvested for making
rain-coats).

July 16 3 km. 15° e. off
Kida Sabi, back of Yabaga Lake
July 16 - 7 km. 15° e. of north
of Ibaruma
in thicket in ravine.

6 97 *Flagellaria indica*
common

7 98 *Ardisia sieboldii* Miq.
common

8 99 *Clerodendrum trichotomum* Thunb.
common

40 m.

wine tangled in trees,
fruit immature.
small tree, flowers
white, fruit green, round.
small tree, corolla lobes white, tube
cinnabar.

139

ESUMAE ISLAND.

140

1956 Ryukyu Is.
July 16 " slopes of Yabaga Dale
in bottom of ravine on
steep slope

38000 *Trema* ^{Meiden Bl.} 120 m.
7 rare
1. 01 *Asplenium* ^{Meiden Bl.} common on rocks 180 m.
2. 02 *Asplenium* ^{Meiden Bl.} common on rocks 180 m.
2. 03 *Hoya carnosa* common on rocks and fallen tree trunks
same - a summit ridge 210 m.
1. 04 *Polygala* ^{Meiden Bl.} rare on rocks in full sun
1. 05 *Ligularia tussilaginea* ^{(Burm.f.) Mdg.} common at edge of scrub forest
4. 06 *Viburnum* ^{Meiden Bl.} common in scrub forest
same - high, densely wooded ridge 200 m.
10. 07 *Claeocarpus* occasional
3. 08 *Callicarpa* ^{Meiden Bl.} occasional in undergrowth
same - a steep, densely wooded slope 200 m.
2. 09 *Daphniphyllum*? common

ISEIGAKI ISLAND.

141

large open-branched tree 15 m. high; ripe fruit purplish black

vine, leaves very thick, flowers ~~white~~ waxy, white with red center to corona.

flowers yellow, mostly not flowering.

tree 10 m. tall, flowers white.

tree 10 m. high

142

1956 Ryukyu Is.

38010 ~~lvs.~~? *Diospyros lycioides* Ternstroem
#9 rare *luminosa* H. Langsdorff

3 11 *flex*
rare in undergrowth

5 12 *Diospyros* ~~titonata~~
very common *maritima* Bl.

July 20 - s. side Yanabu Pen.

223 (Photo 950-124) Pandanus scrub in ravine.

(224) Terrace with dense
Imperata, some admixed
of *Codium pilosum*,
Obionea, *Cantharospermum*,
Rhynchospora ultra, *Rosa*,
Paspalum orbiculare, *Setaria*, etc.
The grass is dense and
up to waistdeep.
A few scattered large
spreading pines.

ISIGAKI ISLAND.

143

small tree, fruit
green

— shrub 2 m. tall,
fruit immature

— tree 10 m. tall, leaves
dark green; fruit
immature

Imperial form cultivation
smaller ravine
filled with Pandanus
more important ones
with ravine forest
very mixed.

The wooded hill, so far as can be seen, seem to have a degraded firous forest, much tangled with vines, and with locally scattered pines.

(224) Ravine forest with
Pandanus
Rhus
Bischofia
Macaranga
Melia

Maesa
Pouteria
Mallotus japonicus
Ficus virens
Symplocos?
Thespesia
Pithecellobium?
Annona? prickly spiny tree
Ardisia
Diospyros manilensis
Erodia
 opp. lobed. serrate trifoliate
 shrub.
Mallotus graminatus
Garcinia
Clerodendron
Chretia
 "Brennia"
Madrilus
Ficus retusa
Raphiolepis
Dystylium
Ficus canthiflora
Leptophloeus

July 20 - Sabieda, 1 km. n.e. of
 Yarabu Dake, s. side
 of Yarabu Peninsula
 in wooded ravine

38013 *Ardisia sieboldii* Blq.
 5 common

3 14 *Vitis lanata* Ker.
 occasional

7 15 *Turpinia crenata* Nakai
 common

shrub 3 m. tall,
 flowers white
 - vine, climbing in
 - thicket
 small tree 6 m. tall
 fruit immature.

146 1956 Ryukyu Is.

38016 ~~Filherobium~~?
common

same - open grassy
terrace

40m.

5 17 Hypericum common locally

3 18 ~~Petaria~~ (Petaria) Hildebrand common generally

2 19 ~~Sorghastava~~ (Sorghum vulgare (L.) Pers.) Makino
common

2 20 ~~Urtica~~ (Urtica) pygmaea (L.) Pers.
very local on bare soil

1 21 Alysicarpus occidentalis (L.) Benth.
occasional

1 22 Rhynchospora nitra (Lour.) Makino
on bare roadsides

3 23 Fimbristylis
on bare roadsides

4 24 (grass) ~~between~~ in above (Bent.) L. Pers.
occasional in disturbed places

25 ~~Scirpus~~

same - in moist ground
below spring

5 25 Scirpus
rare

3 26 Fimbristylis miliacea, det. J. H. Lam
common

2 27 (stat.)
rare

2 28 Cyperus glaucus All.
occasional

2 29 Fimbristylis
rare

ISHIGAKI ISLAND.

147

tree, buds very young.

flowers white.

stems trailing

caespitose

caespitose, blade set
perpendicular to sheath.
flowers purple.

38030 *Toenia*
2 occasional

1 31 ~~(sp.)~~ *Succowia corydallina* (L.) Benth. A. ⁱⁿ class
rare

just south of
July 20 - Ogan Yaki, n. w.
point of Yaraba Peninsula
on rough limestone rocks

2 32 *Phyllanthus*
edge of low cliff just above
high tide level

2 33 ~~Headscent?~~
common at ^{and} below high
tide level

3 34 *Limonium arbusculum* (Maxim.) ^{Makino}
common at and below high tide level

35 ~~Fimbristylis cymosa~~

5 35 *Fimbristylis cymosa*
(also on volcanic rocks)

36 *sedum uniflorum* H. & A. ^{St. R. 1952}
very local, just above
high tide level on detached
boulder

sunai, near Ogan Yaki
~~sand~~ on sand ridge

37 *Caravalia* ^{sp. nov.}
common

1-2 m.

shrub, n. tall, leaves
not distichous.forming a dense mat
clinging close to rock.depressed dwarf shrub,
leaves sub-fleshy, flowers
lavender,
caespitoseplant pale glaucous
green, fleshy.prostrate, creeping,
flowers pink.

July 20 - Ogan Yaki,
n. w. point of Yaraba Peninsula
on steep sloping volcanic
tuff in open very low
vegetation, above sea.

(over)

38078 (green) *B. edulis* (Lam.) Oliv. 10m.
 5 very abundant on steep slope 5m.
 5 39 (legume) very common 60m.
 1 40 *Pteris* ^{falcata} in crevice in high cliff 60m.
 4 41 *Cocculus* local on high crest 60m.
 3 42 *Hedysarum* *albido-punctata* common generally

July 21 - summit of
 Yaraby Dalle 216m.
 4 in ^{scrub} forest on
 volcanic rock
 5 43 *Mallotus japonicus* M.-A. edge of ~~open~~ small clearing
 6 44 ~~Daphniphyllum~~ common
 2 45 *Diospyros ferrea* var. very common 216m.
 3 46 *Raphiolepis* ^{lutea} (Lam.) Pers. common
 6 47 ~~Daphniphyllum~~ ^{lanceolatum} (Lam.) Pers. occasional
 5 48 ~~(Lam.)~~ *Melica cuspis* (Thunb.) Sarg. common

July 20 - ridge ~~south~~ of
 Yaraby Dalle
 on densely wooded broad
 ridge

forming a loose mat.
 prostrate, forming
 loose mats.

twining in low scrub,
 flowers white.
 prostrate, long plants
 in shade of rocks,
 short ones in full sun;
 flowers white.

shrub 2 m. tall.
 shrub 2 m. tall
 small tree 3 m. tall;
~~with~~ fruit immature
 (yellow when ripe).
 shrub 2 m. tall; veins pellucid
 fruit immature.
 shrub 2 m. tall; fruit
 immature
 shrub 2 m. tall,
 fruit green.

152

1756 Ryukyu Is.

78049 *Diplosora*
occasional

9 52 *Neolitsea ohbana* Koidz. - det. C. K. Allen
occasional

4 51 *Podocarpus macrophyllus*
occasional (Thunb.) D. Don

1 52 *Ilex macropoda* Miq.
occasional

5 53 *Ardisia pentagona*
occasional

3 54 *Callicarpa*
occasional

4 55 *Cinnamomum* &
occasional

4 56 *Ficus* common at lower levels

1 57 *Pleioblastus* abundant at lower levels, forming understory in rather dry forest.

July 24 - north side
of Yaraba Peninsula
in lowland thickets

1 58 *Ficus septica*
common

3 59 *Lamium*
common

ISHIGAKI ISLAND.

153

160m. tree; fruit immature.
↓

tree 8 m. tall, 10 cm. dbh;
fruit immature.

small tree 15 m. tall,
sterile.

shrub, fruit immature,
nut galls conspicuous.

shrub 1.5 m. tall, fruit
immature, depressed
globose slightly pentagonal.

shrub 2 m. tall,
fruit immature.

small tree, sterile,
leaves both opposite and
alternate.

shrub or small tree,
fruit yellowish.

100m. erect, stems green, in
small clumps from
rhizome.

20m.

small tree, fruit depressed
globose, ribbed, immature.

shrub 2 m. tall,
flowers white, fruit
bright red.

July 21 - north side of
Yarabu Peninsula

(217)
(Photo
950-168)

Lower slopes have
masses of rough post-
Miocene limestone with
openings and thickets.

(218)

Above the last limestone
the slopes are wooded
and the forest is more or less
typical *Diospyros*-*Ardisia*
forest. In addition to
the *Diospyros* mentioned
and *Ardisia* there are
Diospyros ferrea, *Ficus*,
Dendropanax, *Elaeocarpus*
japonicus, *Hedysarum staphyl*,
and other species.

(219)

At the top of the slope
is a more or less level
broad-topped ridge, well
wooded with a forest
about 15 m. tall of
Ficus retusa, the
evergreen *Ficus*, *Cinnamomum*,
and *Dendropanax* as the
commonest trees.

Where this ridge begins

(220)
(Photo
950-170)

narrow and *Quercus*
cuspidata comes in and
becomes fairly abundant.
Podocarpus is a common
understory tree, here
reaching 5 m. tall.

From here on ~~southeast~~
southward the forest
becomes lower in place,
perhaps 10 m., with
Quercus, *Elaeocarpus*,
Dendropanax, *Diospyros*
ferrea, *Ilex*?, *Piplochrys*?,
Ardisia, etc. For some
distance there are very
few ferns. The undergrowth
is of *Psychotria*, *Eugenia*,
and, well up, *Croton*.
There is a very little
Freyssinetia, no epiphytes.

Along the ridge toward
Yarabu Dake are signs
of disturbance in the form
of such plants as *Trema*,
Mallotus paniculatus, etc.

In places on the slopes
of ~~the~~ Yarabu Dake itself
the forest is higher,
more luxuriant, with
considerable ferns on
the ground.

The actual peak is a
knob of volcanic breccia,
somewhat disturbed by
an installation of some
sort put up by the Japanese
during the war. Here are
a few pioneers such as
Mallotus japonicus. This
knob is surrounded by

a scrub forest of *Diospyros*, *ferrea*, *Ilex*, *Myrsine*?, *Premna*, *Ficus virens*, "Myrsia", *Euonymus*?, *Firmiana*?, *Rhus*, *zuccedanea*, *Raphiolepis*, *Pouteria*, *Camellia*, *Arenga*, *Daphniphyllum*, *Garcinia*, *Ficus retusa*, *Dendropanax*, *Podocarpus*, etc. This is dense and only 3-5 m. high. The rock surface under it has *Pyrrosia*, *Peperomia*, etc. The *Peperomia* is glaucid and not very fleshy, has no spikes. Probably result of drought.

From here the high country, of broad ridges at about the same height, seems largely covered with oak forest, if the large spreading gray-green trees which cover up to 60% of the area are oak, as is probable.

Eastward the oak seems less prominent and the large rounded eastern peak seems not to have any.

Garcinia seems scattered through most of the forest seen on this mountain mass.

Going down the main westward gulch from Yarabu Dale the vale very soon disappears, leaving a *Diospyros*-*Ardisia* forest with more and more *Ficus* lower down. The gulch is wet and ferns are luxuriant.

The west coast is lined with bluffs of post-Mioocene limestone with the usual forest, *Himourium*, *Hedysarum* ~~and~~ *sedoides*, *Timbriostylis*, *Eleocharis* (?) common at about high tide level. On some of the low cliffs are fair sized *Pemphis* trees (3-4 m.)

Oganjaki is the new point, is of bedded, seaward dipping brown and green tuffs. The seaward parts are bare of vegetation. Between tides they are conspicuously pitted by sea urchins.

The flora is much poorer than that of corresponding limestone strand. The only plants seen common to both are *Acacia*, *Pouteria*, *Vitis*, *Hedysarum*, *Zygia tenipolis* and *Timbriostylis*.

The vegetation on seaward steep slopes, bluffs ~~is~~ is of patches of low *Acacia*, low *Pandanus* scrub, *Misanthus*, and a low mixture of *Timbriostylis*, *Zygia* spp., *Indigofera linifolia* a prostate pea, (*Hedysarum albidopunctatum*) and a soft grass.

(232)
(Photo
950-70)

July 21 - Inota
 2 grassy patches
 south of s. part of Inota
 are *Miscanthus*.

2 patches, north of
 n. part are *Imperata*
 with some *Miscanthus*
 on w. slope over road.

Wide belt of littoral
 forest in front of Inota
 and also in front of
 village just north of
 Inota.

Many patches of
 forest on lower slopes
 of mts. being cleared
 for pineapples, all along here

North of village
 north of Inota the steeper
 grassy slopes are *Miscanthus*
 the lower gentler ones are
Imperata.

Wooded slopes across
 bay from Ibanuma -
 looks like a much degraded
 phase of *Diospyros* - *Ardisia*
 forest with *Pouteria*
 unusually common.

Probably has suffered
 a light burning, judging
 from number of half dead
 trees.

Trees seen in hasty
 examination

*Diospyros*漫生
Ardisia
Pouteria ferruginea
Raphiolepis
Ficus - ribbed fruit.
Ogania specata
Rhus
Fraxinus
Ficus retusa
Neolitsea
 spp. ind pinn. comp. with follicles
 all. . . . like *Carys*
Ficus - caudiflorous
Elaeocarpus japonicus
Arenga
Ficus sp. (subcordate)
rema
Vendlandia
Pinus luchuensis
Diastylium
Diospyros ferruginea - esp.
Ficus burigata (small fl.)
Quercus cuspisata
 scattered (large fl.)
Cerbera
Mallotus paniculatus
Ficus (dark fruit)
Lauras
Mallotus philippinensis
Morus

This forest may be a degraded oak forest, or the oaks may be just sporadic this low. This altitude, that of the highest point of the road, would seem to be about the present lowest extreme of the oak forest.

The few areas of grass here are *Imperata*, but to the south, where there is a secondary scrubby mixture there is *Miscanthus* in openings.

Nosoko area has remnants of a tall *Ficus* forest along stream and even on post-inundated limestone.

South of Nosoko a large mangrove swamp has mainly *Rhizophora* about 3-4 m. tall with around edges some *Bruguiera* and *Coccoloba*, *Thespesia*, *Pandanus*, *Acacia*

162

1956 Ryukyu Is.

July 22 1 km. s.w. of

nosoko-Itshi-habi

38060

#8

rare in degraded forest
on steep slopeJuly 22 1 km. s. of Nosoko
on Fukido-gawa6 61 *Bischofia javanica* Bl.
in roadside thicket4 62 *Excoecaria* ^{common in} ~~multiflora~~ L.
edge of mangrove swamp5 63 *Theespesia populnea* (L.) Sol. ex ^{comes}
common in edge of mangrove
swamps

July 22 - near waterfall

1 km. s.w. of Yonohama

6 64 *Mallotus paniculatus* (Lam.)
common in roadside
thickets

38060 11 ISLAND.

163

tree 6 m. tall, fruits
immature.5- small tree; fruit
brown.0.m small tree 5 m. tall,
lactiferous.0m small tree 4 m. tall,
flowers closed in
afternoon, reddish.
(note involucral bracts)

of Arakawa,

M.-A.

5m.

small tree 5 m. tall.

July 23 -

(233)
(Photo
930-110)

Low scrubby forest of high point on schist ridge - ~~much~~ *Quercus*, much *Ardisia*, some *Dendropanax*, *lauraceas*, etc.

Ferns rather abundant, some epiphytes - orchids, etc. Ground cover of ferns and several herbs, seedlings, etc. *Alpinia*. Undergrowth thin *Psychotria*, *Rhododendron* (?) + several other shrubs, saplings.

(234)

Main divide - scrub forest about 6 m. tall, occasional taller trees

Ficus virgata

Pouteria

Dendropanax

lauraceas - several

Viburnum

Ficus retusa

Schefflera

Cinnamomum

Ardisia

stryax

Camellia *Podocarpus*

Small shrubs
Dense scrub

The upper slopes are strongly wind-sheared, and with conspicuous grooves 6-8 m. apart. These grooves are doubtless due to wind, as there is absolutely nothing to correspond with them below the canopy.

Tangled with Freycinetia, ~~slipper~~ ^{date} and some Smilax. Thin undergrowth of various shrubs incl. *Sarcandra*, *Cryptotria*, *Neolitsea* & etc. Little or no *Quercus*. Sprouting of trees 1-3 m. Canopy fairly complete.

Ground cover of ferns, rather sparse.

This ridge rather broad and flat topped.

At the edges the scrub is much more depressed from wind shearing. Much more densely tangled with Freycinetia. Grooves very prominent here.

Ground cover of *Ligularia*, etc.

July 27 -

near of Tornino

lowland thickets and

(737) marshy ground
38065 *Coisia laeteviridis* Jobi L.
rare in open wet ground
66 *Barringtonia* common along tidal stream

2 67 *Callicarpa* on rough limestone
on rough limestone

5 68 *Neottia* (not a herb) (in Webster 1700)
on rough limestone

3 69 *Artemisia vulgaris* L.
common on road fill
70 *Arveja tremula* (Blanco) Bess.
common on rough limestone

3 71 *Ficus virgata* Reinw.
common on rough limestone
1 72 *Terminalia* ~~calycophora~~
in thickets on rough limestone
2 73 *Bauhinia* ~~gymnorhiza~~
limbing in thickets on rough limestone

2 m.

1 m.

4 m.

2 m.

4 m.

6 m.

caespitose, 1 m. tall.

small tree 6 m. tall
racemes pendent
flowers pinkish white,
immature fruit square
in iron section.scandent shrub,
flowers whitish.
shrub 2 m. tall; fruit
black when ripe,
pleasantly acid.aromatic herb 1 m. tall,
branched.caespitose, stems
2 m. tall, leafy all
the way to base;
upper leaves reduced,
fruiting panicle
somewhat nodding,
ripe fruit bright red,
most of those in cluster
not ripe yet.

small tree, sterile.

vine

Westward along ridge forest much higher wetter luxuriant ferns several limestone.

(235)
(Photo
950-59) Down the north slope the forest is very wet and luxuriant - filmy ferns and many others, ground orchids and Begonias.

At about 150 m. the forest changes - becomes drier and *Ficus* becomes most abundant, oaks disappear. *Arengas* becomes very common.

(236) Near the bottom petioles in a broad ravine on ground is a grove of *Livistona* plants. *Pistachia* & *Macaranga* 5-3 m. Some palms very tall, trunk 10 m. Many logging only at extreme base.

Livistona - "kuba" (y)

Arengas - "mani" (y)

Lowland forest on limestone - principally *Ficus*

July 23 - high slopes of ~~Takata~~^{Takana} ~~Yama~~^{*Yama}
above Tomino, 1.5 km. w. of
~~Mossoan Lake~~ Hora Dake
on steep wet wooded slope

38074 *Lasiandra* ^{new sp.?}
common in undergrowth

3 75 *Asplenium*
on moist rocks in ravine

49 76 *Begonia leucostachys* from Hora Dake
in dense shade

5 77 *Trichomanes* ^{var. lateritium}
on rocks in dense shade

8 78 (orchid) ^{new sp.?}
terrestrial in deep shade

2 79 (sub.) ^{new sp.?} (most) R.B.
rare

5 80 *Polypodium* ^{new sp.?}
climbing on tree-trunks

~~Takahama Yama~~
July 23 - main divide
of island, 1-1.5 km. w. of
~~Mossoan Lake~~ Hora Dake
broad wooded ridge,
soil.

4 81 (brom.) ^{new sp.?} from Hora Dake
5 82 ^{new sp.?} ^{new sp.?}
in dense scrub at top of slope

2 83 *Freylinetia* ^{new sp.?}
abundant

4 84 common

9 85 *Pouteria* ^{new sp.?}
common

340m.
T.G. *Brachyopoda*
380822 33

shrub, fruit immature.

scapes and petioles
fleshy, ascending to
erect, flowers pink.

perianth dull orange,
column pale yellow
vine climbing in trees
flowers white.
rhizome closely appressed
to tree-trunks.

81 woody vine, flowers white
82 shrub 2.5 m. tall;
fruit immature
climbing in trees

tree 8 m. tall, sterile.

tree 6 m. tall, leaves
glossy beneath; fruit immature.

172

1956 Ryukyu Is.

38086

5*Berchemia* ~~common~~
rare(233)5July 23 - Basata Yama
in scrubby forest37

abundant locally

2

(trebliat)

rare, epiphytic on *Quercus*
Quercus cuspidata Thunb.5

common

all day - Saturday

ISHIGAKI ISLAND.

173

vine climbing in trees,
flowers greenish white.

260 m.

flower yellow, red spotted
with in, fading red.
tree 10 m. tall, fruit
immature.

July 26 - Ishigaki Island
trip by boat up east
coast and around
island from Ishigaki
City - start 7:30 a.m.

Brown bell-shaped
medusae in water in
harbor.

Small rock just
east of harbor, 200 m.
offshore covered by
Poraria, *Lepturus* and
Ischaemum.

From Ishigaki to
~~Hiraha~~, covered by dense
littoral scrub on very
low undercut limestone
cliffs. Then a stretch
of about 0.4 km. of beach
with scrub on beach
ridge. Then perhaps
0.3 km. of similar low
cliffs with scrub this
very depressed at margin,
higher slightly back.
Then beach almost to
Obama point, backed
by a scrub-covered ridge
except opposite Obama.
Cliffs and littoral
forest around Obama point

From Miyara point
around to opposite the
beginning of Hiraha
are alternating stretches
of beach with short
stretches of low cliff,
with almost continuous
littoral scrub.

Opposite Hiraha is
a long stretch of beach
with boulders scattered
along inner edge of
reef flat. Back of
this is broken scrubby
forest, largely of *Casuarina*.
From Hiraha northward
for 1 km. or so is a clear
beach backed by a
scrub-covered beach
ridge. The end of this
beach near Hiraha
is of pebbles (or cobbles),
the rest is mostly sand.

South of mouth of the
Todoroiki gawa are a
couple of short stretches
of low, undercut cliffs,
separated by a stretch
of rather high sand
beach. Ledge back
of all of this. At the
mouth of the Todoroiki
the cliff is broken into
many discrete flat-topped

segments or rocks.

From here north is a long clear beach, backed by a high, sandy ridge covered by scrub or low littoral forest, to beyond the Schist hills. Here it is interrupted by several large outcrops of schist rocks, scattered over a half Km. or so.

July 28 - north end of Island - 4 schist peaks. Examined nest to last on grassy slopes, mostly *Imperata* with usual associates. Rocky top has dwarf, shrubby depressed vegetation of *Croton*, *Ficus*, *Glyciodendron*, *Smilax*, *Rubus*, *Rosa*, *Carmona* (?), *Psidium*, *Cunya*, *Ardisia*, *Paederia*, *Dianella*.

July 26 - Hirakubo

Beach ridge north from village to mouth of estuary.

The beach is abundantly interrupted by undercut remnants of rough limestone. The ridge has dense low littoral scrub forest of *Pandanus*, *Isaevola*, *Premna*, *Thespesia*, *Hibiscus*, *Ligustrum*, *Messerschmidia*, ~~Rapanea~~, ^{note} *Pittosporum*, *Hernandia*, *Pouteria*.

The estuary has *Phizophora*, *Thespesia*, *Excoecaria*, *Pandanus*.

The open flat to the front of the scrub has *Spinifex*, *Sporocarpa littoralis*, *Euphorbia chamaissoides*, *Lippia lepturus*, *Carytha*, *Vitis*, *Isaevola*, *Thespesia*, *Ischaemum*.

July 26 - continuation
of trip around island.

From just south of the
n.w. point to the west point
(Dachsaki) the beach
is thickly beset with
underewⁿ limestone remnants.
There are only about 3
short stretches free of
them. The rip is about
1.6^{1.8} m. high. Below it is
rather abraded, the rough
pitting somewhat smoothed
down. Above it is quite rough.
There are a few neritids but
not many. A few limpets
and other snails, also.

The areas that were
noted as burned on first
visit to area south of
Hirahubs have turned from
black to rather light brown.

Between the first headland
south of Ibaruma on the
west coast and the
area ~~south~~ west of
Kabira there are scarcely
any ~~open~~ areas where
grass grows very much
by the steep slopes, as

it does so conspicuously
north of these and on
the other coasts.

On the volcanic knobs
on the end of Kabira
peninsula the cyads
are exceptionally dense
on the seaward sides,
on the upper slopes.
The lower slope are
grassy.

On the very steep seaward
side of the ridge back
of Oganjali is a thick
scrub forest with
what appears to be an
unusual proportion of
Garcinia specata.
This wood probably
secondary, is very conspic-
uously wind-sheared and
wind grooved.

1956 Ryukyu Is.

jiba gawa,

July 26. 0.7 km. n. of
Hirakuboon sand ~~bed~~ ridge
back of beach38090 *Hernandia sonora* L.
common in littoral forest7 91 *Ligustrum*
occasional in littoral forest42 *Hedyotis*
common on2 92 *Buchenia*
local in open places2 93 *Lippia nodiflora* L.
common in open place2 94 *Hedyotis*
on rough pitted limestone
remnant.4 94a *Eurycoma*
in littoral forest
July 26 - near Hirakubo village,
north end of island
on rough pitted limestone
remnants2 95 *Ledum formosanum* N. E. Br.
var. *formosanum* R. Moran
very local1 96 *(Asclepias)*
uncommon4 97 *Clematis* sp. var. *zythocarpa* Greene
common3 98 *Hedyotis*
common3 99 *Raphiolepis* Link var. *microphylla* Greene
common4 100 *Ficus* sp. (m.) Willd.
local

2 m.

small tree 5 m. tall,
small tree; sterile.prostrate, forming
a close mat; flowers
dried, apparently abortive.
prostrateprostrate; leaves sub-fleshy,
flowers white.shrub 3.5 m. tall, flowers
yellow-green.fleshy, fruit ~~dry~~ ^{ripe} when dry.twine, flowers
pale green, fruit immature.
vine, tangled in
bushes.prostrate, leaves scarcely
fleshy.shrub; fruit immature.
depressed shrub; sterile.

same ^{open sandy} - summit of
conical hill of schist.

33101 *Eurya* ^{rare}
4 ~~or~~ *Sporobolus*
4 02 (conf.) *Sargassum* ^{common}
8 same - among schist boulders
1 03 (obs.) *Adonis amurensis* ^{rare}
rare, almost dried up.
8 same - on grassy plain
at foot of schist hill
2 04 *Lespedeza cuneata* G. Don
frequent
3 05 *Fimbristylis*
common
1 06 *Chrysopogon aciculatus*
rare
1 07 *Sporobolus* ^{occasional}
same - in patch of littoral
forest on beach
7 08 *Phormium* ^{and other non-*coyotis*}
occasional

80 m.

low stiff bush; fruit
immature.

heads nodding.

50 m.

prostrate, sterile.

40 m.

erect, branched at base,
spreading by slender
rhizomes.

1 m.

culm ascending.
culms ascending

small tree, sterile.

1954 Ryukyu Is.

July 27 - YCAT Compound

Inonotus peruviana (Decne.) Noe

38109 *Ipomoea quamoclit* L.
cultivated

July 28 - Agricultural Experiment Station, north of Ishigaki city

5 10 *Acalypha godseffiana*?
cultivated, being propagated
in large numbersJuly 28 - w. of YCAT
toward Konan-furi
- large chestnut oaks
Partially scrub
covered. Flora:

- f *Premna obtusifolia*
- f *Carmona retusa*
- f *Bauhinia*
- f *Ficus virgata*
- f *F. retusa*
- f *F. wightiana*
- f *Clematis*
- c *Murraya paniculata*
- o *Pittosporum tobira*
- n *Imperata cylindrica*
- c *Polypropodium scolopendria*
- o *Phisacanthus floridulus*
- n *Psilotum nudum*
- c *Hibiscus tiliaceus*
- n *Commelinia*
- n *Morinda citrifolia*
- c *Ampelopsis*

1 km. N.
of Nagafuri
1 m.

= HIGAKI ISLAND.

twining, flowers deep
cimson red.shrub 2 m. tall, leaves
coppery bronze, edged
with white.

- n *Arundo donax*
- n *Clerodendron inaequ*

Seaside rocks of ~~the~~
paleozoic breccia or
conglomerate -

The high tide level
community here is
of *Zygia tenipolia*
Rhynchosia arbesculum
Sporobolus virginicus?
Leskevia portulacaria
+ the prostrate legume

found on Ogasawara.
Possibly *Hedysarum*
but on a rock out in
the sea which could
not be reached.

July 29 Kannon Shrine

This shrine group is mostly pine but with many *Calophyllum* around the buildings, not especially large trees. A coconut tree has some nuts.

Smaller trees of *Codocarpus*, *Casuarina*, *Codiaeum*, *Carica*, and some bananas planted around buildings, as well as some herbaceous ornamentals

Flowers
Caesalpinia pulcherrima
Gomphrena globosa
Alternanthera versicolor
Rosa

July 28 east of ~~Tomonosaki~~

78111 *Cleome viscosa* L.
 7 locally abundant in cultivated fields

4-12 ~~*Thessiera japonica*~~ ^{Aplolepis}
 local in grassy areas

July 29 - Isli Sobo, 0.5 km. S. of

6-13 *Bridelia* ^{water} ~~Decaisne~~
 scrub forest on summit of dissected hard limestone peak

Banna Lake

100 m. shrub or small tree; fruits black when ripe.

July 29 - Ishi Loko
 peak of fantastically
 dissected limestone,
 cut and channelled
 into jagged pinnacles
 and ledges, with
 large ledges on
 sides.

Vegetation principally
Ficus, with *Diospyros*
Mallotus, etc.

Dense scrubby forest
 but with some bare
 slopes.

- a *Ficus retusa*
- a *F. wightiana*
- a *F. virens*
- c *F. erecta*
- c *Porteria ferruginea*
- f *Diospyros maritima*
- l *Arundo donax*
- c *Mallotus philippinus*
- ~ *Brindelia*
- ~ *Garcinia spicata*
- a *Arenga tremula*
- c *Leptolepis (falcata) pinnata*
- c *Premna obtusifolia*
- o *Morus*
- s *Pterocarpus?*
- ~ *Glochidion*
- la *Pisonia aculeata*
- ~ *P. umbellata*

- la. *apocynaceous* scandent
 shrub
- Cassia*
- Pipturus*
- Broussonetia papyrifera*
- Ardisia*
- Flagellaria indica*
- Hoya carnosa*
- Asplenium nidus*

July 30 - YCAT Compound

38114 *Ipomoea pes-caprae* v. *brasiliana*
abundant on lime sand.

2 15 *Vigna marina* (Burm.) Merr.
common

2 16 *Calophyllum inophyllum* L.
occasional

July 31 - bet. ~~the~~ ^{0.5 km. s. of *} Todorohi Gawa.

3 17 *Cypris revoluta* Thunb.
in scrub vegetation
on limestone

beach in front west of
Aug. 1 - YCAT Compound, 1 km.

18 *Morus australis* Poir.
in beach scrub

Thrown up on beach by Typhoon

2 19 *Thalassia hemprichii* (Ehrenb.) Aschers.
Syringodium isoetifolia (L.) Kütz. Dandy

2 20 *Halimeda*

3 22 *Codium*

1 km. w. of
Nagataki

1 m.

prostrate, forming
large mats, flowering
scapes erect; corolla
~~scutellata~~ ^{rose} purple
with 5 deeper stripes
in throat stigmas
capitate, white.

prostrate, forming
mats.

small tree, sterile.

15 m.

caespitose, thick stems
covered by leaf bases,
rosettes of spreading
leaves, surrounding
hemispherical mass
of incurved fruiting capsules.
Seeds orange red.

shrub 1.5 m. tall, with
only new leaves on
fruiting branches

w. of
Nagataki
1 m.0 m.
det. C. den
Hartog 1969

cavesterete

Aug. 1-2 - Ishigaki Island - Typhoon "Wanda" - Strong winds started July 3, but did not reach any marked intensity until the morning of Aug. 1, when during the forenoon velocities of ~~60-70~~ knots were recorded by the Ishigaki weather station. Some examination was made of the coastal scrub vegetation along the beach west of ICAT compound during the height of the wind, 11-12 a.m. Little perceptible effect was seen except a sort of watersoaking of leaves of *Scorodonia*, *Ipomoea*, *Clerodendrum* and *Vigna*. The sand was washed out from the seaward side of the vegetated bank leaving the *Ipomoea pes-caprae*, *Vigna manna* and *Ischaemum* at the mercy of the wind. The wind slackened some later in the day and a visit was made to Kannon Daire. Here there was little effect except some drowning of leaves and

similar waterlogging when leaves were exposed to driven salt spray.

A strong, dry wind blew during the night and all day Aug. 2. An examination was made from 3-5 p. m. ~~from~~ ~~to~~ along the beach near the compound and from Ishigaki City to the Yaraba Stream and back inland along the road behind Banwa Daire to Ishigaki.

Where there was direct exposure to the sea almost all the leaves had turned brown. *Pandanus* seemed unaffected and *Scorodonia* less so than most. Inland the only visible effects were many banana plants knocked down, some sugar cane knocked down, a few branches broken off *Comocarpus* trees, and general almost complete defoliation of *Uncaria glauca*. ~~Assent~~ ICAT a few branches ~~over~~ along the coast *Pandanus*, *Calophyllum*, *Carica* and *Icicus retusa* suffered least.

Cladodendrum inerme
 seemed hit hardest,
 but *Ribes*, *Tilia*,
Vitis, ~~Pithecellobium~~, *Premna*,
Scaevola, *Ischaemum*
muticum, *Ipomoea pes-caprae*
Vigna marina, *Morus*
australis, *Leucaena*
glauca, *Vitis rotundifolia*,
Euphorbia characias.
Wedelia biflora, *Sambucus*,
Euphorbia heterophylla all
 suffered browning of
 leaves and twigs.

Great quantities of
Thalassia, *Codium* sp., *Turbinaria*
Sargassum and *Halimeda*
opuntia were thrown up
 on the beach.

In town the *Morus* suffered
 a considerable browning
 of leaves. the *Garcinia*
 not at all.

Upper end on limestone
 has also *Vitis*, *Cladodendrum*
Mallotus (glaucus), *Melia*,
Psidium.

Aug. 4 - Miyara Valley,
 e. side.

Ravine cut in fine
 bedded gravel, with
 partially cemented
 to conglomerate, overlain
 by post-miocene limestone.
 Beds of iron cement in
 the gravel.

Below it ravine forest -
Ficus virgata
F. wrightiana
F. retusa *F. kingiana*?
Cyathea *F. erecta*
Pinnularia *F. (cauliflora)*
Ardisia
Arenaria
Schefflera
Zardozia
Angiopteris
 many other ferns
Woodia
Dustylium
Glossyendron callicarpum
Flagellaria
Liper
Toddalia
Alpinia speciosa
Elaeagnus *Musa*
Rhus
Claoxylon japonicum
Glochidion longiligulatum

Aug. 4 - upper & regular v.

Erosion scar on scint
and gravel

Athyrium

Gleichenia

Eryngia

Blechnum

Lycopodium cernuum

Ranunculus

Distylium (a lymphocar)

Miscanthus

Rhynchospora rubra

Ostbeckia

Rosa

Andropogon

Cinnamomum camphora

& Ficus erecta

Imperata

small *Andropogon* etc

gravelly clay terrace
near peat bog -

Topical soil sequence
(acc. Stensland) is top 18-24"
fine reddish clay, next
few inches a layer of
clay with abundant
small quartz pebbles,
then thick layer (many feet)
of generally clay material
with miscellaneous
angular fragments, mostly

small but many
very large, but very
poorly sorted, unbedded.
Beneath this a thin
layer of yellow silty
sand, then fossiliferous
gray clay.

Topographically
below this is a somewhat
similar material
showing limestone influ-

The non-limestone
one is grass-covered.

The other is cultivated.

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1936 Ryukyu Is.

Aug. 6 - Miyara

bare limestone in road cut and around monument.

38123 *Portulaca oleracea* L.
3 roadside ditch5 24 *Boerhaavia multabilis* R. Br.
common3 25 *Portulaca pilosa* L.
common, seen only here.

Aug. 4 - 1 km. n. n.e. of

Kawakami, about 5 km. n. of Miyara
in erosion scar on thin
gravelly sediments on low
schist knoll.5 26 *Brachythecium orientale* L.
common9 27 *Sphenomeris chinensis* (L.) Maxon
~~see *Cymbopogon*~~ abundant6 28 ~~*Cymbopogon*~~ *Cymbopogon tortilis* (Presl) A. Camus
very common

Aug. 5 - Shira Mts., upper Naguna Valley

1 29 *Echinodorus crassifolii* (L.) Beauvois
edge of rice field3 30 *Angiopteris evecta*
in wooded ravine.
A. subpinnatifolia W.H. de Vries2 31 *Bridelia watsonii* ?
in wooded ravine2 32 *Melia azederach* L.
bank of wooded ravineAug. 5 YCAT Compound ^{1 km. w. of Nag} ~~o. of Isahgaku~~ City2 33 *Ischaemum muticum* L.
edge of thicket on sand flat back of beach

15m.

OK

depressed, fleshy.

prostrate, leaves pale
beneath; flowers white.prostrate, fleshy;
flowers crimson-magenta.

40m.

OK

culms erect, caespitos.

35m.

OK
A. Chaserhizome barrel shape, covered by
stipulate leaf bases; fronds
3-4 m. long, arching, joint fleshy,
sterile shrub 3 m. tall,
leaves somewhat glaucous beneath,
small tree; fruit green.

Laki 1 m.

OK
A. Chase

18 200

Aug. 5 - YCAT and
Ishigaki city -
salt damage to
various plants is
showing up more
clearly now. The Casuarina
which showed little or
no effect right after
the typhoon shows a
considerable browning
now. *Calophyllum*
likewise. *Leucaena* leaves
and twigs are dead as
though singed. *Ficus*
wightiana is losing
its leaves in great
quantities. The *Morus*
in Ishigaki city streets
has largely lost the
brown leaves. Seems to be
bursting into flower now.

Aug. 6 YCAT compound, 1 km.
w. of Naga-hali

38134 *Morus australis* var. *glabra* Koidz.
5 planted

1 m.

small tree; completely defoliated
after exposure to salt spray
during typhoon, bursting into
flower within 5 days after
typhoon.



